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Personal Computing

MAY 1979

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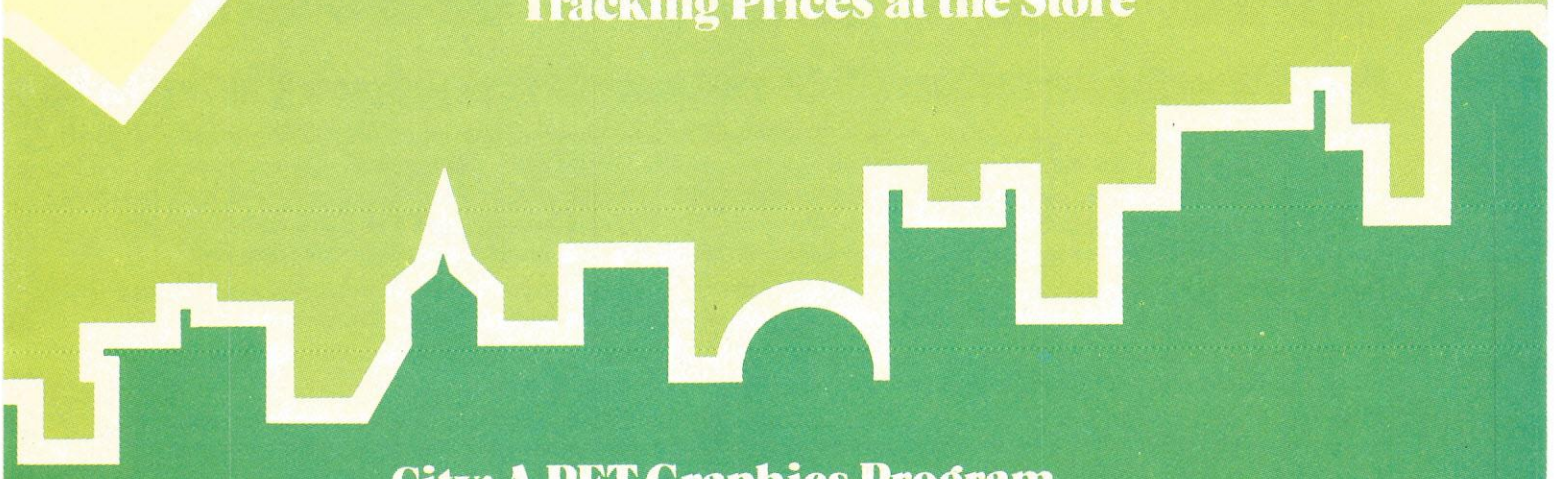

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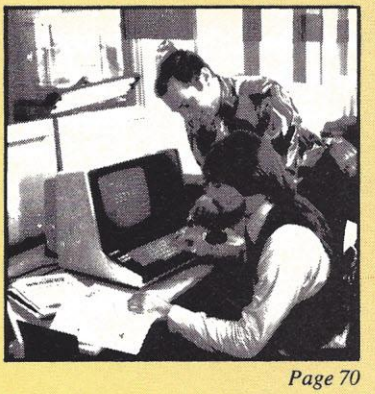
CIRCLE 1

Personal Computing

Publication Number USPS 370-770 MAY 1979 VOL.III NO.5



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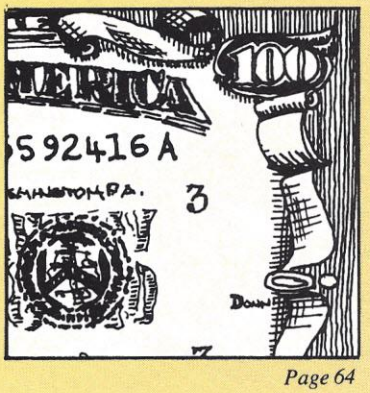

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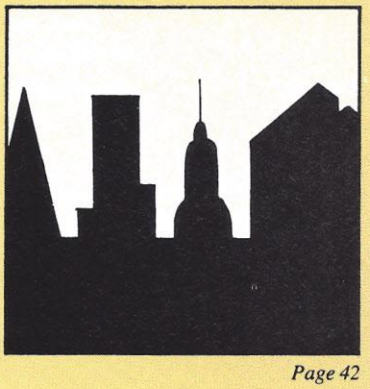

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Cover Design
by David Bastille

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LAUNCHING PAD

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Word processing power comes to the TRS-80 with the Electric Pencil. This inexpensive yet powerful program is useful for dozens of business and home applications. *by Joseph A. Greenleaf*

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Learn how your computer can serve as an important, day-to-day aid in maintaining your family's health. *by Keith A. Jones*

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Appreciating Depreciation 26

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City 42

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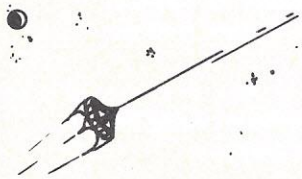

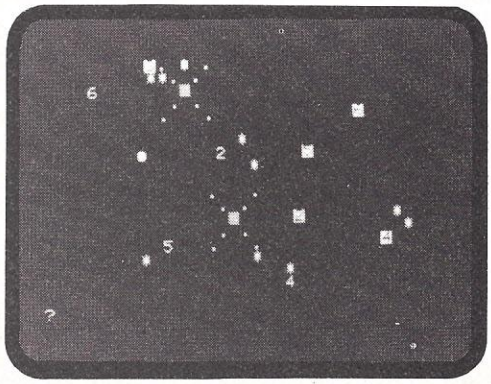

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Personal Computing

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Publisher. Published monthly by Benwill Publishing Corp.: Harold G. Buchbinder, Chief Executive Officer; George Palken, President; Domenic A. Mucchetti, Treas. Executive, Editorial and Subscription Offices: 1050 Commonwealth Ave., Boston, MA 02215. Controlled Circulation postage paid at Long Prairie MN. Membership in Audit Bureau of Circulation pending.

Subscription rates. U.S.: 1 year (12 issues) $14; 2 years (24 issues) $26; 3 years (36 issues) $38. Canada & Mexico: add $4/year for surface mail, $8/year for airmail. Other countries: add $8/year for suface mail, $36/year for airmail. Send subscription orders and address changes to: Circulation, Personal Computing, 1050 Commonwealth Ave., Boston, MA 02215. In Japan/Asia: Hiro H. Irie, International Business Corp., 11-8, Narita-Higashi 1-chome, Suginami-ku, Tokyo 166, Japan; Phone (03) 311-1746. In Europe: Personal Computing c/o LP Enterprises, 313 Kinston Road Ilford, Essex, Eng. IG1 1PJ tel: 01 553-1001. **Back Issues.** U.S.: $3. Canada & Mexico: $4. All other countries: $6.

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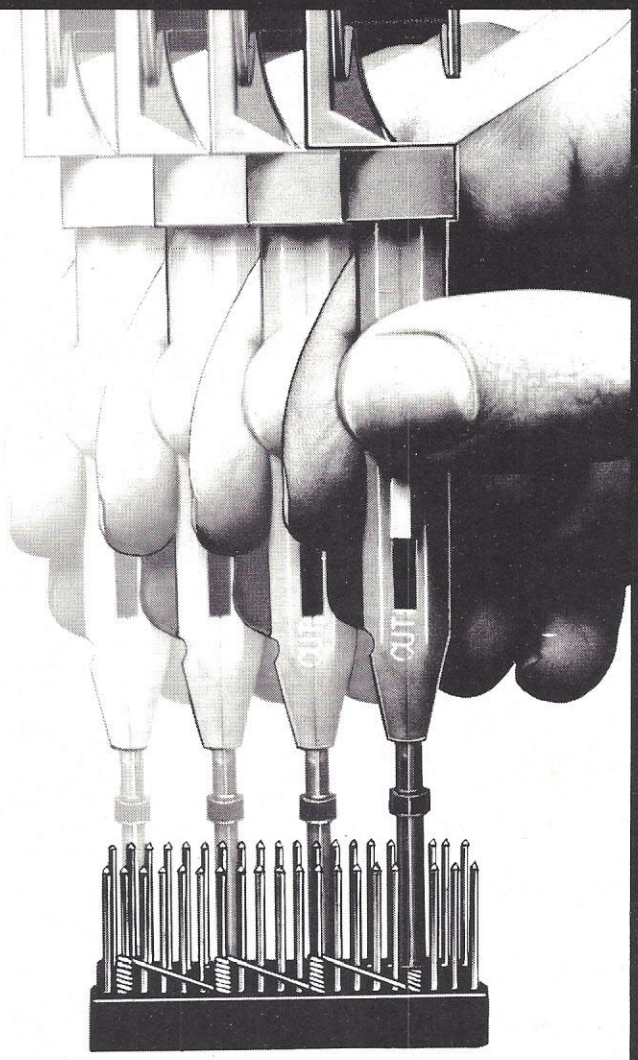

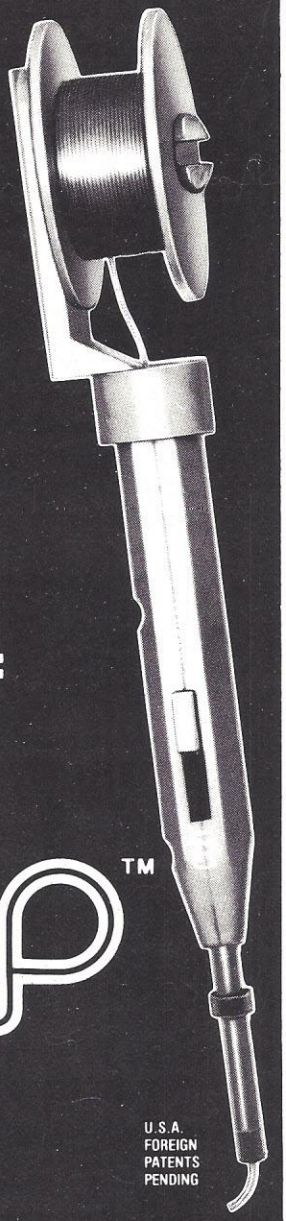

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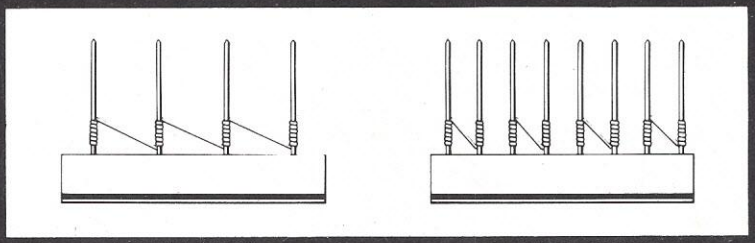

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CIRCLE 6

FEEDBACK

Some Missing Bytes in the Menu Plan

Editor's note: Bugs live in publishing houses as well as in computers. As several readers pointed out, a "bug" nibbled away several bytes of Sam Newhouses's "Menu Planning" program from our February issue. On page 34, parts of lines 9740 to the end of the listing were cut off. Below, with our apologies, are the missing lines.

—D.W.

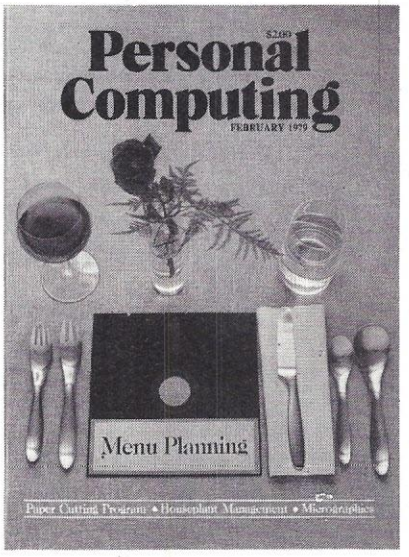
```
9740 DATA 74,110,10,7.3,.8,320,.1,205,300,5,0,0,0
9745 REM *** 75. SWISS CHEESE (3470)
9750 DATA 75,99,7.8,7.9,.5,259,.25,199,0,0,0,0,0
9755 REM *** 76.HALF & HALF (3475)
9760 DATA 76,20,.5,1.8,.7,16.2,0,6.9,72,2,.15,0,0
9765 REM *** 77.HOLLANDAISE SAUCE (3480)
9770 DATA 77,48,1,4.1,1.6,22,.18,0,208,0,.25,0,0
9775 REM *** 78.BUTTER (3485)
9780 DATA 78,100,.1,11.2,.1,2.8,0,138,462,0,0,13,0
9785 REM *** 79.COTTAGE CHEESE (3490)
9790 DATA 79,118,15.5,4.75,3.25,106,.34,258,190,7,0,0,0
9795 REM *** 80.HONEY (3495)
9800 DATA 80,64,.1,0,16,1,.11,1.1,0,5,.21,0,1.8
9805 REM *** 81.LIME JUICE (3500)
9810 DATA 81,4,.1,0,1.3,1,.03,0,2,0,3,0,0
9815 REM *** 82.CHOPPED PARSLEY (3505)
9820 DATA 82,12.5,1,.15,2.4,57,1.8,12.5,2380,4,48,0,1.6
9825 REM *** 83.RAISINS (3510)
9830 DATA 83,116,1,.1,27.8,25,1.4,11,8,4,.4,0,0
9835 REM *** 84.POPCORN (3515)
9840 DATA 84,66,1.4,3.1,8.3,1.1,.31,271,0,2,0,0,0
9845 REM *** 85.LEMON JUICE (3520)
9850 DATA 85,4,.1,0,1.2,1,.03,.1,3,0,7,0,0
9855 REM *** 86.SAFFLOWER OIL (3525)
9860 DATA 86,125,0,14,0,0,0,0,0,0,0,0,13
9865 REM *** 87.SESAME SEEDS (3530)
9870 DATA 87,35,1.2,3,1.3,73.4,.65,3.7,2,5,0,0,0
9875 REM *** 88.WHEATGERM (3535)
9880 DATA 88,24,1.8,.7,2.7,4,.5,.2,0,10,0,0,0
9885 REM *** 89.TOMATO CATSUP (3540)
9890 DATA 89,19,.3,.1,4.3,3.7,.14,177,238,0,.07,0,0
9895 REM *** 90.HORSERADISH (3545)
9900 DATA 90,2,.1,0,.5,3,.05,4.8,0,0,0,0,0
9905 REM *** 91.RUSSIAN DRESSING (3550)
9910 DATA 91,74,.2,7.6,1.1,2.8,.09,130,104,0,.9,0,0
9915 REM *** 92.TAMARI (3555)
9920 DATA 92,8,.8,1.5,12.3,.72,0,1099,0,0,0,0,0
9925 REM *** 93.BREWER'S YEAST (3560)
9930 DATA 93,28,3.9,.1,3.8,21,1.7,12,0,10,0,0,0
9935 REM *** END OF TABLE MARKER
9940 DATA -99

OK
```

Getting Back to Basics

Dear Editors:

It seems to me that you ought to have more articles on computer basics. I have absolutely no knowledge of computer science but am fascinated by it. I should think more articles on this subject would be of value to your readers. (To this one anyway.)

Lou Mitchell
Chicago, IL



Editor's note: It may come as a surprise to you to learn that not many people have a knowledge of computer science. It is not too difficult to learn a programming language (such as BASIC) and use it to converse with a microcomputer. Most people in the U.S. are finding that out. They buy computers like the PET, or the TRS-80; they learn about 30 single-word commands, and their machines are off and running. It's almost like the commands used in discipline-training a dog: SIT! STOP! HEEL! BEG! FETCH! LIE-DOWN! ROLL-OVER! etc. The computer, like the dog, will obey the proper commands. Computer science itself is a highly technical subject. Very few people know exactly how the computer works (just as not too many people know exactly why airplanes stay in the sky without falling). To fully understand the science of computers you should study electrical engineering with a major in computer circuits. When you consider that an electric current runs through a computer circuit, turning microscopic "switches" on and off to transmit a code, and does this all at the speed of light then you can understand how highly complicated computer science becomes. Most computerists treat their devices like automobiles: they enjoy maneuvering them around and travelling from one place to another, but they leave the engineering to the specialists in Detroit. If you were to open a book on computer technology to page one, the chances are pretty good you'd close it at page two. *—H.S.*

Income Property Correction

Dear Sir,

There seems to be an error in the program listing of "Income Property Evaluation" (January 1979) in line 700. It currently reads:

```
700 PRINT"TOTAL DEDUCTABLE=
$";INT(100*(14+T+D+12*
(G4+Z)))/100;"1ST YR"
```

It should read:

```
700 PRINT"TOTAL DEDUCTABLE=
$";INT(100*(14+T+D+12*G4))/
100;"1ST YR"
```

This error not withstanding, it is an interesting article. Keep up the good work.

Dr. Irving Birnbaum
Des Moines, IA

Author's note: In response to the letter from Dr. Irving Birnbaum, there is an error in line 700 as he describes. The line should read as he indicates.

This error was made in reproducing the line listing and did not effect the output examples.

Another section of the program which could cause confusion is line 260. The double asterisk is used as an exponent sign on very few machines. There may be some questions about the double asterisk. The following might be clearer:

```
260M=L4*((R/1200)*T4↑(Y*12))/
(T4↑(Y*12))-1))
```

—Kimball J. Beasley

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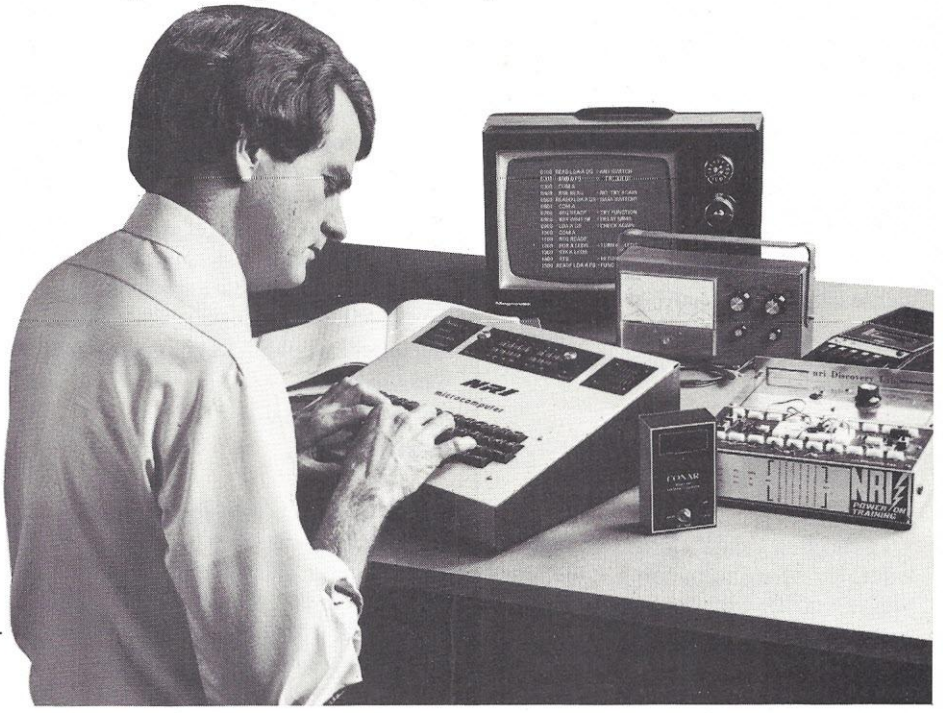

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CIRCLE 7

Calculating Responses

Editor's Note: In our January Feedback section, Ben Crane gave several article suggestions, including expanded coverage of calculator programs, artificial intelligence and programs in languages other than BASIC. We asked for response from other readers on these ideas. —*M.M.*

I agree with Ben Crane. There are thousands of us who have programmable calculators (many of us future owners of computers) and I would like to see more articles about them or adaptable algorithms.

Arthur Ehrlich
New York, NY

I echo Ben Crane's letter — to the letter. Do what you're doing, add some programmable calculator stuff, a business (practical) column and keep up the good work!

John McGinley
New York, NY

I own a PET and would love to see more programs in BASIC.Many more people own machines which run BASIC than those who own a TI or an HP programmable calculator. Publication in a journal such as *PC* of programs whose only purpose seems to be justification of ownership of a programmable calculator and doesn't add anything more to a game than a pair of dice is a waste of "paper real estate" and is self defeating.

Hank Mroczkowski
Erie, PA

Dear Sirs:

Although I have no interest in computer chess I do agree with the letter from Mr. Crane in the January 1979 issue. I would like to feed my HP programmable calculator more than those long number-crunchy equations. More articles on artificial intelligence would certainly please me. I would love to read articles on some inventive simulation games. I realize that there is a demand for programs in BASIC, but what about us little guys. I saw my 1802 Super Elf hanging out with a couple of ogres. It tells me there's nothing else to do. Certainly there are some languages other than BASIC that are more efficient. Let's hear more about new software developments that might change the market! And what about some fiction? It's not hard to miss those full page requests for some creative writing. Let's have some variety, you know, some greens to go with the meat. Come on guys let's cooperate. Let's give those people at *Personal Computing* something new to print. Many thanks Mr. Crane; if you didn't write that letter I wouldn't have known what I was missing.

Mr. K. Rubotzky
Barrington, RI

Editor's note: As Mr. Rubotzky said, our articles come from our readers. So why not write an article or program for *PC?* Just type it up and mail it to Editor, *Personal Computing,* 1050 Commonwealth Ave., Boston, MA 02215. —*D.W.*

A Pat on the Back

Dear Editor:

After reading so many complaints about vendors of computer peripherals, I'd like to salute on of the "Good Guys" of the industry. We're always quick to condemn but how many of us take the time to give praise when someone's worked hard to earn it?

I nominate for "The Good Guy of the Month" Warren Rosenkrantz, superstar of V R Data Corporation in Folcroft, PA. After dealing with several other rather questionable firms I received a flyer from V R Data congratulating me on the purchase of my Radio Shack TRS-80 and listing several peripherals at very attractive prices. I investigated and, to make a long story short, began what I hope to be a long and rewarding business relationship.

Warren and his staff exhibited a willingness to help a fledgling computerist. They brought back that old, forgotten trait that makes good businessmen great — the customer comes first. Sure, like everyone else in this mad industry, we had problems — printer modifications that didn't work, the disk drive that gave weird results. However, Mr. Rosenkrantz spent considerable time and effort to correct these problems and, together, I think we both learned a lot. He's also very knowledgeable in the field of electronics and is quickly becoming a pro on the TRS-80.

Warren of V R Data has earned praise from this very satisfied customer.

Clifford W. Coughlin
Upper Darby, PA

Misleading Photo

Dear Editors:

The December 1978 issue of *Personal Computing* contains a photograph of a computer terminal with the words "Library of Congress Information Retrieval Service" displayed on the screen. The photograph is part of a "Holiday Gift Buying Guide" written by Gary Dozier. Your readers should know that *no* such service is available via a home computer as the photograph suggests. The Library of Congress does offer a number of computerized data systems to readers on the premises, but these are not available outside the building.

We have contacted the manufacturer of the home computer unit pictured and they have assured us that they will discontinue the use of the misleading photograph.

Craig D'Ooge
The Library of Congress
Washington, DC

Too Much Chess?

Dear Sir:

This is the first time I've written to any magazine, and I only write out of concern for one of my favorite publications. Each month I have anxiously awaited receipt of *Personal Computing;* but recently I've noted such a drastic change in content that I find myself asking whether or not I should continue subscribing to your magazine.

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NOW! The Word Processor you've asked for!

The well known Electric Pencil, which has been in use for over two years with most popular microcomputers, has also been available for use on the TRS-80. We are now proud to announce immediate availability of The Electric Pencil Disk Version for the TRS-80, featuring the same fine capabilities that have made the Electric Pencil so popular. Full price for the TRS-80 version is only $100, and for the TRS-80 disk version, only $150.

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The Electric Pencil is a character oriented word processing system, which means you have maximum freedom and simplicity in the handling of text. No carriage returns or word hyphenations are necessary. Line formatting is done automatically by The Electric Pencil.

The Electric Pencil combines features found in more expensive systems with many capabilities you won't find anywhere. Right margin justification, page numbering and titling, and many combinations of line length, page length, and line and page spacing are always under your control. Text editing capabilities eliminate guesswork when inputting. The text appears on the video monitor as you insert it, and you can view text whenever you wish using the bidirectional variable speed scrolling feature. You can insert, delete, or relocate any text using simple keyboard commands.

The Electric Pencil has been designed to work with both Level I (16K system) and Level II models of the TRS-80, and with virtually any printer you choose. Level II owners will want the TRS-80 disk version, which is supplied on cassette. Transfer of the Electric Pencil to your own disk is as simple as entering a command.

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The Electric Pencil TRS-80 Disk Version is fully interactive with the DISK READ, WRITE, DIR, and KILL routines of TRSDOS 2.1. Any version of The Electric Pencil may be upgraded to accomodate new equipment. For instance, if you are already using The Electric Pencil and have added a floppy disk to your TRS-80 system, simply return the original cassette to Michael Shrayer Software, along with the price difference between your present Electric Pencil and the upgraded version, plus $15 for handling.

Demand a Demo from your Dealer!

Your dealer will have a manual and descriptive literature for you to see, and can demonstrate The Electric Pencil to you, on one or more of his demonstration microcomputers. Look the manual over carefully, and note the explicit instructions which lead you easily through The Electric Pencil operation. The manual was produced using The Electric Pencil which will enable you to see its many capabilities for yourself. Then try it out on your dealer's demo unit . . . most any microcomputer will do. If, for some incredible reason, he's unprepared, demand it! or write:

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CIRCLE 8

Now TRS-80 disk version available for $150.

Why? Well, I enjoy a game of chess and find its theory and application interesting but not to the point that I now find it in *Personal Computing*. Am I subscribing to a chess magazine, or has an overzealous Junior Editor taken it upon himself to feature articles on chess at the expense of other articles, such as I have come to expect from you — articles of interest to novices such as I, or articles on programming small business applications.

Please listen to my criticism as one looking for the magazine you were, not the chess bulletin you have become.

Bill Vick
Plano, TX

Editor's note: Sorry you find the chess section overpowering, Bill. Actually we try to restrain it from expanding in deference to business application programs, but it keeps growing in step with the growth of computer chess in the world. One manufacturer of cassettes tells us that he, alone, has sold more than 10,000 chess programs in a recent two-month period. BORIS, CHESS CHALLENGER and SARGON and many other names, have now become commonplace. BORIS, the popular dedicated chess-playing computer which together with its competitors, is bringing so much diversion into the dreary lives of many "shut-ins", was recently elected a life member of the 100-year old Boylston Chess Club in Boston. Chess has been around for about 4000 years but active computer chess has only been around ten years or so. It is a function that is growing rapidly and we are trying to keep pace with it.

The question of why devote so much space to computer chess echoes the question of why should scientific research itself spend so much time on this subject. There are doubtless many people in the world who consider chess to be merely an idle pastime. However, this ancient board game represents the most popular challenge to human intelligence that man has ever devised. And computer chess has the added promise of revealing, someday, how to duplicate the mechanisms of human intelligence itself. When that achievement is realized, then the computer will indeed become man's greatest invention, as many sociologists have intimated.

Returning to your question of why so much space to computer chess in *Personal Computing*? One can find a parallel in television that reserves most of its Sundays for professional sports because of a proven national interest. This is done to the great disgust of those millions of Americans who have no interest at all in sports. Interest is a human hunger that must be appeased. The greater the interest, the greater the appetite and, subsequently, the greater must be the diet.

If you are not now using your microcomputer, Bill, to play any of man's intelligent games (chess, checkers, bridge, GO, etc.), then you're depriving yourself of the most wonderful characteristic of that remarkable machine you own: the ability to show you it can think. Or would you rather shoot harmless little blips across your CRT trying to knock down the letter "Y" posing as an enemy soldier?

—H.S. (Senior)

Blue on Green

Dear Editor,

Your article (January 1979) on 8K BASIC in PROM for 6800 Systems was interesting and timely. I can't wait to incorporate the 8K BASIC into my SWTP 6800/2 Computer System.

However, I am new to the personal computing field and have some difficulty understanding how to interface Dr. Green's PROM system to my computer. Will someone please tell me where I can get more details, schematics and instructions on interfacing Dr. Green's system.

William H. Blue
Seaford, DE

Author's note: In response to Mr. Blue's letter, let me explain that I designed the PROM board with RAM in the direct addressing range to operate with SWTP 8K BASIC version 2.0 as an educational challenge within the constraints of my abilities and understanding. I wrote the article to share the insights gained in accomplishing this task, namely how to convert software intended to run in RAM to run in ROM.

Exact duplication of my effort to run on a particular computer assumes that the reader will be willing to hand-wire the complete circuit on a universal bread-board compatible with the computer bus. The circuit shown in Figure 2 shows only the buffering, addressing and control circuitry of the board. Data lines, address lines, R/W, 02 and VMA lead to the similarly designated pins of the SWTP 50 pin bus. The wiring of the eight 2708 PROMS and the two 6810 RAMS is not shown explicitly. The wiring of the memory proceeds by tying all like numbered address and data lines together and to the address and data bus buffers. RAM and PROM chip selects (enable low) are tied to appropriate chip select lines in Figure 2. Extra chip selects on the 6810 RAMs are tied high or low as required. The pinouts of the various ICs as well as an understanding of the function of each should be obtained from a data manual. The understanding is invaluable in trouble-shooting a nonfunctioning circuit. (I had some trouble because I wasn't careful in dressing my Vector Slit-N-Wrap wiring. Wires can short through the insulation when forced to rub together.)

A better solution for Mr. Blue would be to acquire a version of BASIC which could reside in the 8K of EPROM on his SWTP 6800/2 processor board which accepts four 2716 EPROMS. This couldn't be used exactly as in my article for there is no provision for RAM in the direct addressing range from 0000 to 00FF hex. A BASIC which operates at a high memory address would be fine. A starting address of C000 hex is particularly suitable since BASIC could be brought up simply by typing "Z" (equivalent to J C000 in SWTBUG).

In fact, I have already modified my system to this configuration with SWTP 8K BASIC version 2.0 starting at C000 as have others here in the St. Louis Area Computer Club. I relocated my previously modified BASIC using the TSC relocator and changed the command table manually.

It is a mystery why SWTP has not marketed an 8K BASIC in ROM to fill those four empty 2716 sockets on the 6800/2 processor board. A new high performance BASIC should be available soon from TSC. If it is ROM-able and will run at a high memory address, Mr. Blue and I may both be able to use it.

I don't believe I can offer a listing or a cassette of my C000 BASIC copyrighted by SWTP in unmodified form.

—Dr. Samuel I. Green

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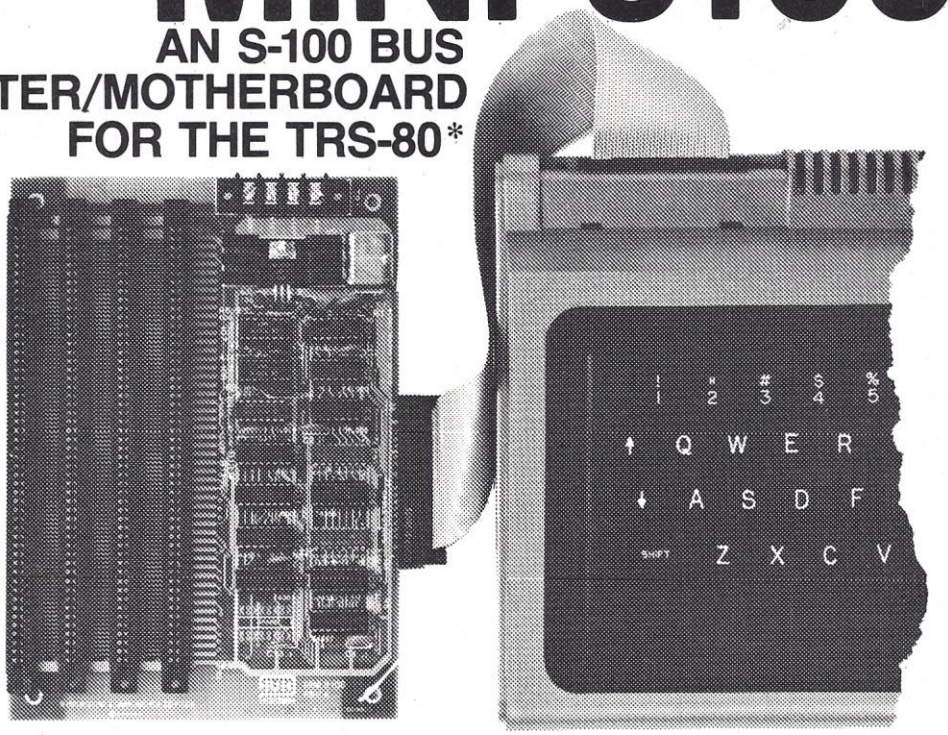

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CIRCLE 9

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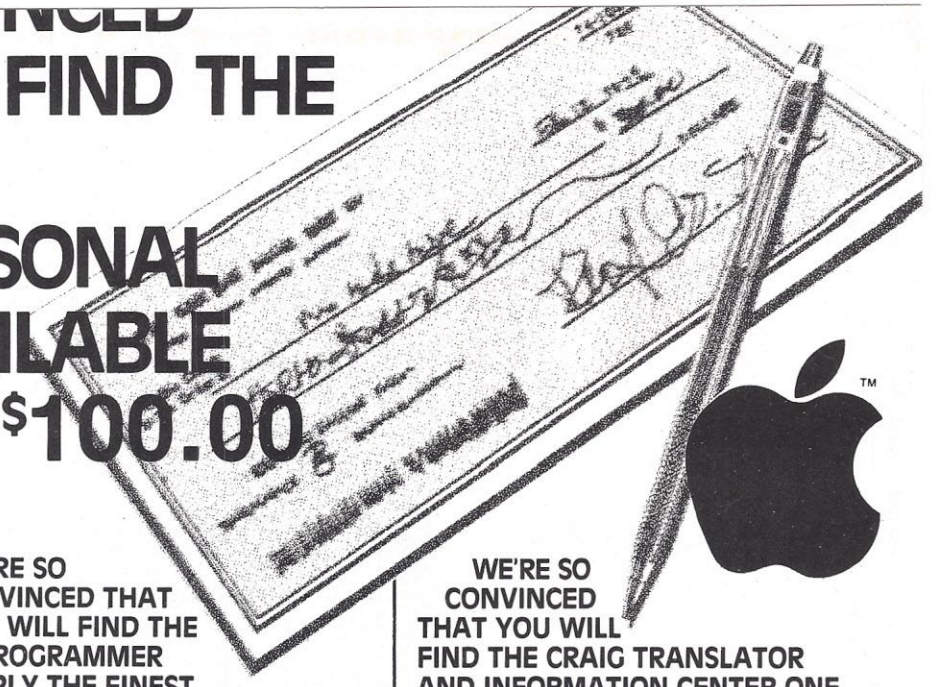

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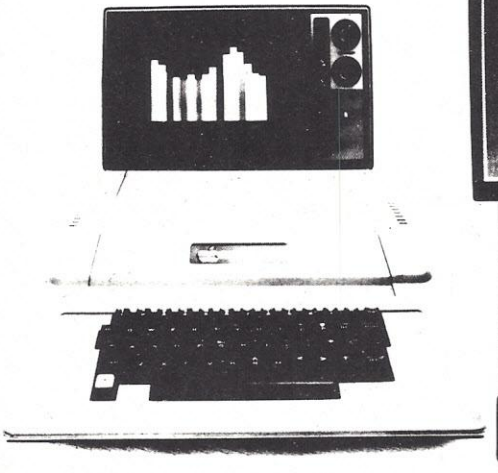

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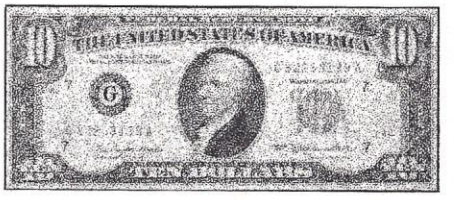

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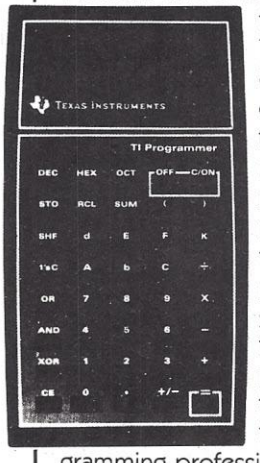

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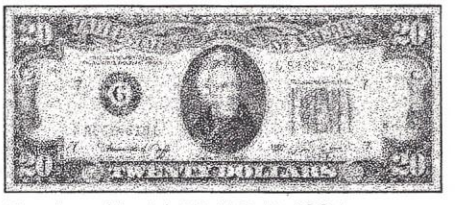

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CIRCLE 10

RANDOM ACCESS

Computer Conferencing Creates Special Relationships

Elderly women in a nursing home and handicapped children at a nearby cerebral palsy center are being linked through a computer conferencing project, creating a special "grandmother-grandchild" relationship.

The project is possible due to an $800,000 National Science Foundation grant awarded to the New Jersey Institute of Technology. Expected to span four years, the project deals with the extension of computer conferencing concepts into the realm of general communication systems.

The research is conducted under the leadership of Dr. Murray Turoff, a pioneer of computer conferencing applications.

The system is simple to operate, said Dr. Turoff. From a remote terminal the user puts in the code name for the recipient and at his own pace composes a message. When the message is complete it is transmitted as a unit to the computer and held until the recipient requests transmission or until "live" conversations between two or more parties can be held.

With the special groups participating under the grant — residents of the Daughters of Israel home in West Orange, NH, and selected children from the Cerebral Palsy Center in Bellville, NJ — the sense of timelessness is especially important. Cerebral palsy victims are frequently limited in speech and muscle control, making it nearly impossible to converse by voice or writing. Through the use of special equipment, youngsters can carefully assemble a message and see the results of their work.

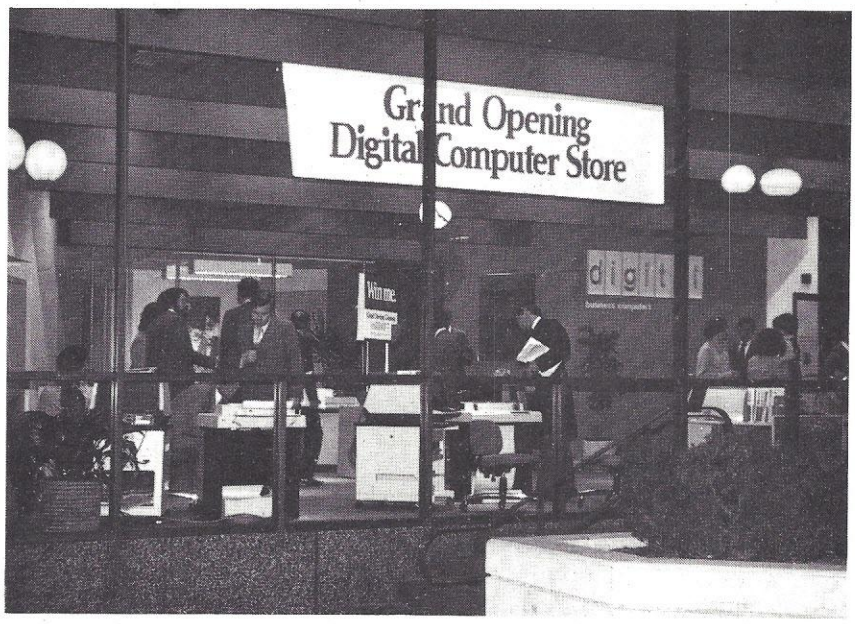
"The very fact that these groups are essentially immobile and largely dependent upon the assistance of others has encouraged the participants to confide wholeheartedly to their friends at the other terminal connection," said Dr. Turoff.

Dr. Turoff's team study of computer conferencing will go far beyond the linking of surrogate grandmothers and disabled youngsters. A large segment of the research effort is being devoted to the study of business applications of conferencing, particularly in decision-making processes. Extensive computer conferencing networks would enable a corporate president in New York, for example, to engage in business dialogue with board members throughout the nation.

Dr. Turoff expects conferencing to reach the general public within a decade, based on the low cost of transmission (about 50 cents for a 200-word message), speed and convenience.

Other applications for computer conferencing range from broad educational use to the possibility of a national messaging system that could replace the bulk of federal mail handling. It is expected that eventually multilanguage exchanges will be developed, providing additional applications for business and government, said Dr. Turoff.

"It is important that the social implications of conferencing be thoroughly explored," Dr. Turoff said. "We have the opportunity to improve human communication through applied science; we do not want to waste the opportunity."



Digital Equipment Corp. has opened its second retail computer store, this one in the heart of Boston's financial district. The first, opened last July, is located in Manchester, NH.

The store offers one system, two printer options and six application software packages, targeted to firms with under 100 employees, including small businesses, small professional offices and independent divisions and branches of larger companies. The basic computer system costs about $12,000, while software packages sell for $200 to $500 each. (Photo by Dave Powell, *Minicomputer News*)

Mini Calculators Produce Maxi Results

In the fierce competition for investment dollars, the programmable calculator may soon become an invaluable tool for investment managers — especially for those without ready access to computers, predicts Hamilton, Johnston & Co., Inc. This new generation of calculators can be programmed to help banks and investment firms prepare investment performance reports comparable in sophistication to those that computer systems routinely provide, the consultants said.

Designed originally for scientists and engineers, the programmable calculator carries a large amount of computer capability in a package so small it can be easily held in the palm of the hand. Financial consultants have already demonstrated that such calculators can be programmed to analyze large amounts of comparative investment data and to evaluate investment performance.

"Using our programs and comparative data, a money manager can work out his own performance analysis reports on a calculator right at his desk," says James R. Hamilton of Hamilton, Johnston, a firm marketing investment-performance software packages for calculators. Hamilton advises, however, that while both programming and comparative data are provided, the money manager still must do the same kind of preparation that he'd do for a computer run. Once he's worked out simple summaries of assets and monthly transactions, he can quickly measure a fund's performance against a variety of financial yardsticks. He can also generate time-weighted and dollar-weighted rates of return based on the standard formulas for investment performance published by the Bank Administration Institute. He can generate data on alphas, betas, correlation coefficients, variability and other statistics.

Software for the service includes analytical systems and comparative data, monthly institutional fund indexes and traditional market indexes, input and output forms, instructions for preparing input directly from a fund's custodial reports and a sample format for preparing reports. Hardware includes a Texas Instruments Programmable 59 Calculator or comparable instrument with carrying case, magnetic cards that are updated monthly, a card wallet and an optional hard copy printer. Service cost is comparable to an outside computer service, says Hamilton.

Bagel Bakery Boom

The bagel business is booming at Lender's Bagel Bakery, and a computer is part of the reason why, according to the company's controller, Al Shaiken.

Headquartered in West Haven, CT, Lender's is one of the world's largest manufacturers and distributors of bagels, said Shaiken. "The bagel has traditionally been thought of as an ethnic food, but recently it's become very popular throughout the United States."

Reflecting this popularity, Lender's has grown approximately 45 percent in annual sales over the last two years. "But we have been able to decrease our annual payroll by about $4700 because of increased efficiency due to use of a Basic Four business computer," Shaiken added.

Initially, the firm purchased a Basic Four Model 400 in 1972, but with the sharp increase in business, Lender's recently installed a System 610 which provides faster throughput and stores all of the company's data on-line. The System 610 consists of four video display terminals, 72K system memory, 70 million character disk capacity and a 300 line per minute printer.

Lender's Bagel Bakery was established in 1927 by Harry Lender. At that time bagels were produced by manually operated equipment. Today, the founder's sons, Murray as president and Marvin as vice president, run the business. Production is fully automated with frozen bagels distributed daily to warehouses throughout the United States. The company has over 200 employees at manufacturing facilities in West Haven and New Haven, CT, and West Seneca, NY.

Prior to installing the Model 400, Lender's used an outside computer service for accounts receivable and payroll. They were also doing many of their routine office functions manually. All the data left the office. "There was a seven day waiting period for payroll and our accounting functions were at the mercy of a number of elements, including snowstorms," said Shaiken.

"Now, with the Basic Four system we are in greater control. There's no lag in billing time and when we need information we simply call it up on the computer's display terminal."

Lender's uses its computer for a variety of applications including accounts receivable and payable, brokers' commission statements and a perpetual inventory.

With the System 610, the company is expanding the number of applications to include weekly "bagel reports" to salesmen, and a "labor vs. production cost" report for management.

"We're working on an inventory of ingredients control, which is a more complex report," Shaiken noted. "This will give us an idea of how effective our formulas are for producing bagels. We will be able to watch our projected production costs in relation to the actual figures as reported by the system. With this information we can determine any cost discrepancies," he said.

"The computer is a very effective management tool. It allows us to monitor our activities on a day to day basis and tighten up procedures when we see something is costing us more money than necessary," Shaiken said.

Bullfrogs Hop Out, Computers Step In

After the bullfrogs escaped through the holes the muskrats burrowed under the fence, only the young carp were left. To make the best of a poor situation, Everett Berry started selling the goldfish to neighborhood pet stores.

That's how Berry Water Gardens, Inc., a multimillion dollar pet and pet supply wholesale enterprise with its own computer and fleet of airplanes and trucks, really got its start.

With headquarters in rural Kernersville, NC, 10 miles east of Winston-Salem, Berry Water Gardens' weekly sales volume runs to hundreds of thousands of units, said the company. To control warehouse operations, inventory and transportation schedules, the company uses a Honeywell Level 62 computer, which Jim Berry, the founder's grandson and director of information systems, describes as his "super machine".

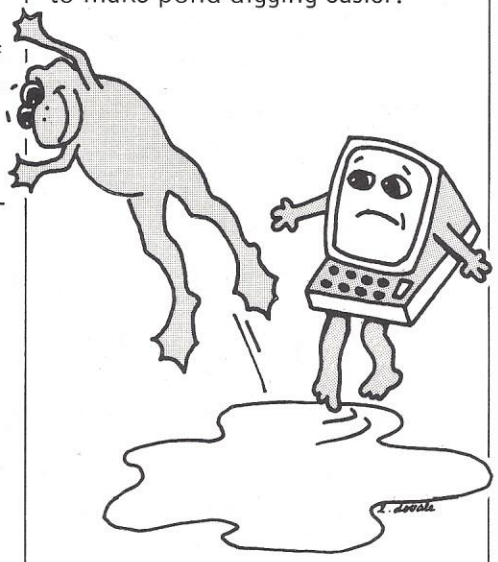
"With the computer we can also provide monthly sales analyses to those of our customers who want them," he adds.

Back in the late '30s, in the middle of the Depression, Everett W. Berry Sr. began to worry about his failing eyesight. A hosiery machine operator by trade, he faced an uncertain future until he read in 1937 about the fun and profit in raising a special breed of giant Louisiana bullfrog, the species restaurants use for frog legs specialties.

Berry purchased a few acres of swampland near Kernersville and dug a pond, erected a mesh fence around it and stocked it with frogs. Then he started to learn some hard lessons about frogs.

To begin with, he discovered that frogs only feed on living things. A friend told him young carp, what we call goldfish, will keep the frogs well fed. Come harvest time, the pond was filled — with goldfish — and hardly any frogs. Apparently the pond was too small and there were these burrowing muskrats. The frogs simply hopped away.

Pond-deep in goldfish, Everett Berry promptly went into the pet goldfish business. From that start, the business expanded to exotic tropical fish and birds, hamsters, snakes, tarantulas and whatever other kinds of small living creatures a customer might fancy. The original hand-dug pond in the swamp expanded to 70 larger ponds during the 1940s and 1950s. By then Everett Berry and his sons had purchased a surplus World War II bulldozer to make pond-digging easier.



Live perishable inventory, the mainstay of the Berry business in its early years, expanded to nonperishables that today account for 80 percent of the company's volume. Inanimate items range from aquarium gravel (in dozens of shapes, colors and sizes) to dog and cat collars. Among the 6000 different drygoods, fish food is Berry's top seller.

In addition to the Kernersville headquarters, the company operates branches in Chattanooga, Jacksonville and Tulsa. Wholesale orders are delivered by company trucks to retail pet stores and to pet departments of chain stores in 18 states from Virginia, west to Oklahoma and south to Florida. The company also owns three airplanes, which make as many as a dozen trips each per week to more distant customers.

To keep track of its vast inventory and sales effort, Berry Water Gardens has used computers for nearly a decade. When its NCR 33 bookkeeping machine became obsolete, the company turned to a computer service bureau to handle invoices and sales analysis. Next came the installation of an IBM System/3 Model 10 that for a time handled invoicing, sales analysis, accounts receivable and item movement.

"We'd outgrown that system, too," the 28-year-old Berry related. "We needed a computer system that didn't need changing every two years. We wanted something that could grow with us, a system that could be expanded easily as we needed more computing power.

Berry's Level 62 system went on line in Kernersville in December 1975. "We converted all of our files and programs from the IBM System/3 to the Honeywell system within two weeks, and with incredible ease," the North Carolina businessman noted.

In addition to invoicing, accounts receivable, product review and other routine requirements, the Level 62 Honeywell system provides monthly sales analyses to Berry customers wanting them. "We ask the computer to print out what a particular customer purchased last year," he said. "We will review and analyze with him exactly what he bought."

Recently the company added an on-line communications capacity that provides branches in Tennessee, Florida and Oklahoma direct access to the computer. Terminals at each location provide the inquiry capability.

Within a year, Berry plans to expand the use of the computer for complete control of all stock in the company warehouses, where thousands of items presently are manually inventoried.

When Everett Berry's bullfrogs deserted the ponds in 1938, who would have guessed their replacements would generate a business so large that re-stocking would require computer technology?

Computer Matches Home Buyers with Their Dream Castles

Buying or selling a home is both an emotional and financial experience, as any real estate person will quickly affirm. Efficiently matching a homebuyer's needs and desires with what is currently available in the market can be vital to a broker's success in the field.

With speed and efficiency in mind, Robert Skalitzky of Sarasota, FL, came up with the concept of "Recoms", a service he planned to use in his own real estate operation, as well as offer to other realtors on a fee basis.

Recoms was designed to match price, size, location and a variety of other amenities with the wishes of a potential buyer. It was obvious to Skalitzky that only a computer would offer the speed, efficiency and memory capacity required.

Skalitzky chose Microdata Corporation's Reality system and for the past two years the real estate industry in the Sarasota area has experienced a jump to rapid, modern and highly efficient homebuying, said a company spokesman.

The computer works out complicated investment analysis, amortization schedules and the past year's real estate activity in any local map coordinate. If there is no property listed to meet the particular buyer demands, the request remains in the computer and the salesman is notified when a suitable property becomes available.

According to Skalitsky, the most important factor to Recom's success has been Reality's ease of use, with portable terminals being used in the field by sales people who simply plug into any convenient outlet and communicate with the central processor via conventional telephone.

"It's instant communication, instant information," Skalitzky claims. "And when you're dealing in a people-to-people service such as real estate, speed and detailed information can make all the difference in the world."

Compared with the more traditional multiple listing service, which is typically outdated as long as a week to ten days, Recoms is updated every night. This means that, for Recoms subscribers and their homesearching clients, a Recoms listing is always available and all the variable information current."

"With Microdata's Reality and the Recoms program concept," says Skalitzky, "the time and effort required of both the homebuyer and the real estate agent is reduced to a fraction of its previous amount. This makes a happy homebuyer and a more profitable and efficient real estate broker."

Promoters Plan Events with Magnetic Tape Drives

Magnetic tape drives are helping promoters determine how many hot dogs, ushers and security guards they will need for entertainment and sport events.

These promoters are relying on a computerized ticketing service known as Ticket Information Computer Systems (TICS), the original equipment manufacturer here for BASS Worldwide (Best Available Seating Service), which manufactures, markets and services computerized ticketing systems.

"We begin with the premise that promotion determines ticket sales," explained Peter P. Schneidermeier, Marketing Director of TICS.

"We operate in an advisory capacity to everyone who is presenting live entertainment," he continued. "The TICS system can provide precise, up-to-the-minute reports on total ticket sales for each event, sales at each individual outlet and each outlet's percentage of total sales. We can advise a promoter when to cancel a show, when to switch ad tactics and how to price a show."

The company now has six installations. These include Houston, the San Francisco Bay Area, Toronto, Vancouver and Adelaide and Sydney, Australia.

"Each city has a central computer capable of keeping track of over 20 million seats. Standing by is a duplicate computer with identical memory which is ready to take over at the flip of a switch, giving the customer the security of a back-up system," Schneidermeier said. "The system has from 192K to 256K bytes of memory, disk drives, tape drives and a 300-line-per-minute printer.

"Computerized terminal outlets are set up in facilities all over the individual areas ranging from record stores to department stores. Each is equipped with a video display terminal, a typewriter, a ticket printer and high-quality telephone lines in constant contact with the central computer.

"When a customer purchases a ticket, the operator keys in the number of tickets purchased and the person who sold them. All of this information is written on tape by magnetic tape drives manufactured by the Pertec Division of Pertec Computer Corporation, Los Angeles, CA.

"The tapes are removed from the premises and kept in a library at each headquarters to be used for marketing analysis. They contain all of the daily transactions and event inventories from each location.

"A promoter can call up until 1:00 a.m. and receive data on current and past events," Schneidermeier explained. "For example, by reviewing the statistics of a similar past show in the same facility as a current show, the computer is capable of analyzing early sales and helps the promoter predict, in a matter of minutes, the amount of food and

the number of support personnel he will need."

The TICS system also offers special services to consumers. "A customer who wishes to purchase tickets is guaranteed the best ticket possible at that particular moment because the computer automatically selects the best seat," he said. "However, if the customer has a particular seat in mind, the computer will display a map of the facility on the screen, allowing him to choose his seat.

"Tickets are printed on the spot and once a ticket has been purchased, it is no longer available anywhere in the system.

"We've recently instituted a telephone order system in two cities so that a customer can call a toll-free phone number, order tickets and use a credit card number for payment. The computer will then tell him where his seats are and the tickets will be printed and mailed to him.

"In all of our markets, we presently handle 18 to 20 million tickets a year. With approximately one new installation every two months and the wide range of services we provide, we expect to surpass 30 million by 1979," Schneidermeier said.

Unearthing an Information Gold Mine

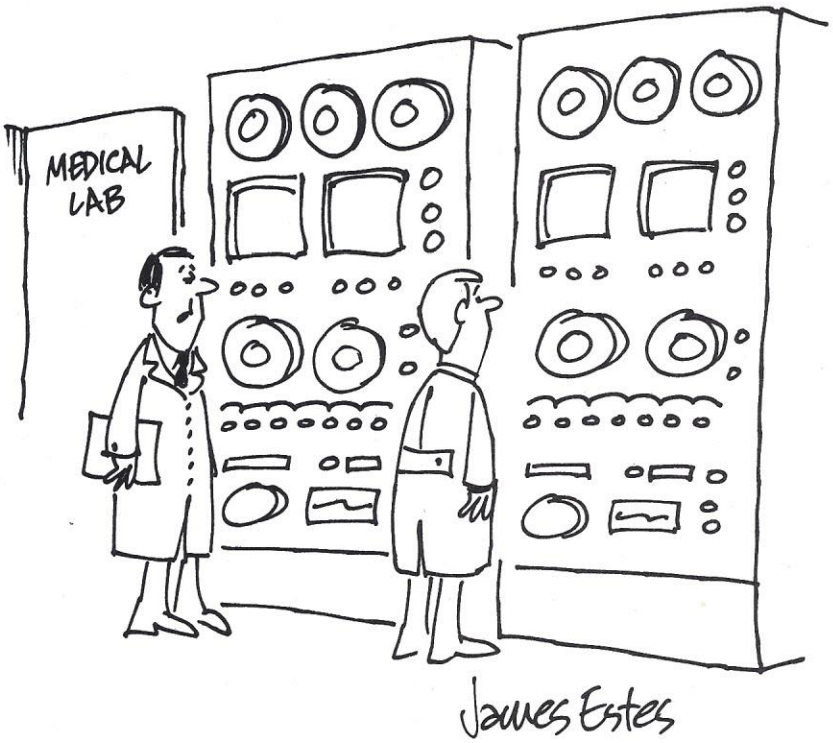
At first glance, the information requirements of managers at Pittsburgh-based Consolidation Coal Company, (CONSOL), appear to be no different from those of key executives in any other $150-million-per-year operation. One difference, however, is that virtually all the important data related to a given mine's daily operation — such as its productivity level, absenteeism rate and labor costs — are available the next morning. If the right managers gain access to the right information soon enough, any necessary corrective action may be taken within 24 hours after the problem arises. To do this, Consol uses a page printing system.

Consol set up a task force to evaluate alternative methods of producing and disseminating the more than 3000 reports used to ensure optimum efficiency throughout the company. The decision, made in 1976, was to lease a 12,000-line-per-minute Honeywell Page Printing System. Two years later, the company upgraded to an 18,000-line-per-minute system.

"We don't baby the system by any means," said Pat K. Moore, Consol's manager of computer services. "It's not restricted here to one or two large volume operations. On the contrary, we print everything we can on it. Whether the report goes to one person or 60, or whether it's one page or 2000, we use the PPS as much as possible. This is why the PPS handles about 75 percent of our printing requirements, or about 1.4 million pages per month."

Another spokesman said, "Most of the time, the system handles internal reports — inventory, payroll, accounts payable, engineering, purchasing, tax and so forth. Many of these, however, are time-critical, including a daily report to five regional offices regarding operations at 55 separate mines. Now, the PPS does 40 copies on 11-by-11 inch paper for immediate distribution."

Another asset of the PPS is its ability to "remember" who gets how many copies of which reports. Changes or additions to distribution lists are accomplished by simply modifying the control blocks or report register. An operator seated at a CRT can make these changes instantly, thereby enabling Consol to maintain a permanent record of which reports go to whom.



"THAT ONE'S FOR SECOND OPINIONS."

Computer Fills Profile Prescription for Pharmacy

Pharmacies in many states are required by law to maintain patient profiles. In the next few years, state or federal legislation may make this procedure mandatory for the entire country, theorized Ron McClellan, owner of McClellan's Pharmacy in Lebanon, PA.

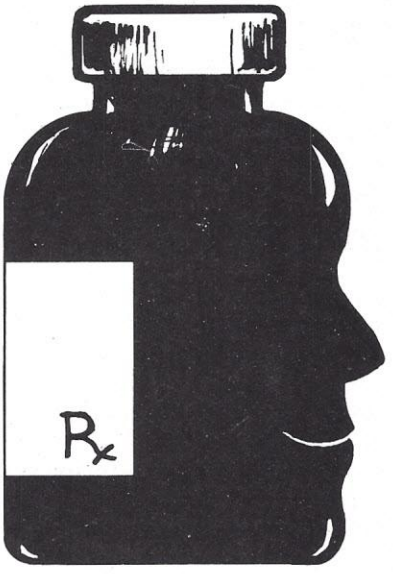
To prepare for that law, McClellan purchased a VDP-1000 Data System, manufactured by the Data Products Division of Lear Siegler, Inc.

"The computer system will keep medical profiles on every customer," McClellan said. "Each time a patient comes in to fill a prescription, the computer will automatically check the profile for conflicting medication being taken or conditions that prohibit the use of a certain drug. If there is no conflict, the new prescription will be added to the profile. Up until now, the entire procedure had been done manually.

"Because this is a complicated process and since we also plan to use the VDP-1000 for several other applications, we wanted a minicomputer system that was programmable in COBOL," McClellan indicated. "The Lear Sieglar Data System met our programming needs.

The VDP-1000 consists of a 16-bit CPU, 32K words of dynamic RAM, the ADM-3A Dumb Terminal, a 180-cps bi-directional Model 310 Ballistic Printer and a 10 megabyte cartridge disk. Customized software was developed for the pharmacy by Harred Computers, Inc., a Lear Siegler distributor.

"Besides meeting potential legal requirements, the computer system was a very cost-effective acquisition," McClellan explained. "I presently have four employees and the volume of my business was becoming large enough — approximately 4000 prescriptions filled per month — to necessitate hiring two more employees to keep customer records and billing up-to-date. With



the time we will save using the system, I won't have to hire more help."

McClellan pointed out that 30 to 40 percent of the prescriptions are paid by a third party such as welfare or insurance companies. The turn-around time before he receives payment can be as long as two to three months.

"The VDP-1000 will help guarantee faster turn-around time because the forms, no longer hand-written, will be computer-generated, eliminating illegibility and incorrect data. We will also be able to mail them out in less time," said McClellan.

McClellan's Pharmacy will also use the computer system to produce prescription labels and customer receipts. By entering the prescription into the terminal, the computer will immediately provide the cost of the drug and reduce inventory, as well as checking the profile and adding the new prescription. The printer will then output the label and the receipt, by which time the prescription will be filled. The computer will also handle all accounts receivable and payable as well as many other special tasks put in the customized software.

"So, besides improving our internal procedures, the system will also provide better customer service," McClellan stressed.

Computer Stamp Exhibits Invited for NCC

A Computer Stamp Exhibit, organized with the cooperation of the Computer Study Unit of the American Topical Association (ATA), will be held at the New York Hilton Hotel during the 1979 National Computer Conference, June 4 to 7 in New York City. Collectors and organizations are invited to submit topical philatelic exhibits on the theme of computers and data processing. Related or more specialized themes, such as history of mathematics or data communications, also will be accepted. Information and entry forms, including rules and regulations, are available from Dr. Ira W. Cotton, National Bureau of Standards, Washington, DC 20234; (301) 921-3517. Entry forms should be submitted no later than May 15. There is no exhibiting fee.

Both competitive and non-competitive exhibits are solicited. Competitive exhibits, which may be entered only by individuals, will be judged in accordance with ATA procedures and will be eligible for prizes including certificates and electronic calculators. Exhibits accepted for display must be sent, prepaid, to the NCC Exhibition Committee, c/o Dr. Ira W. Cotton, Association for Computing Machinery, 1133 Avenue of the Americas, New York, NY 10036 and must be received by May 31.

As a special service to NCC attendees, cacheted envelopes will be provided free of charge and can be serviced using a special NCC cancellation at a temporary postal substation which will be maintained at the New York Coliseum during the conference.

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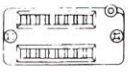

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450ns	$725.00
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CIRCLE 11

Your Family Health Plan

Used wisely under a doctor's supervision, your personal computer can help keep you and your family strong and healthy.

BY KEITH A. JONES

Personal computers have the potential to revolutionize the health-care industry, directly affecting every member of your family right at home. Besides the potential savings on major medical expenses and the benefits to preventive medicine, the maintenance and control of existing medical conditions should open up unlimited horizons for home programmers and their families. With a little study and ingenuity, almost every home programmer can design a comprehensive health plan for his family and put this health plan into program form.

Although there has been surprisingly little written on personal computer use in the existing health-care system, it has been a topic of interest to family physicians for several years. Professional papers have been presented on the subject before many a hospital's grand rounds, and computer science is a popular elective at many medical schools. Although the use of interactive diagnostic and medical self-care programming by the lay public is a matter of great controversy within the medical community, the prospect is generally well accepted.

Actually, *in some circumstances* a well-programmed personal computer could be more valuable than a doctor making house calls; you wouldn't have to wait for the doctor to return a phone call or arrive at the house. Although there is no substitute for a doctor when an emergency arises, the educated computer can instruct you to look for symptoms to decide whether the prospective patient should be rushed to the emergency room, and what to do, if anything, on the way to the hospital.

There are obvious dangers in developing an over dependence upon your own personal "Dr. Welbytron", but if the limitations of even the best medical self-help program are kept firmly in mind, the home computer should prove a priceless tool in maintaining your family's health.

The greatest benefit of the personal computer should not be in the provision of primary health care, but in the provision of everyday medical advice, both for the immediate present and future health plans. The medically-programmed personal computer should always be regarded as a supplement rather than a substitute to the direct supervision of a doctor.

There are at least three major areas where personal computers can benefit overall health as ancillary or paramedical advisors. Each of these areas requires a special type of program design and implementation.

The first area involves the improved gathering and organizing of data for diagnosis and control of unusual conditions and symptoms requiring possible medical attention. Because doctors can only see their patients for a few minutes at a time, they often miss a great deal. Even laboratory and clinical tests do not always detect everything, especially if the condition is very complicated or erratic. With personal computers, a family can collect pertinent health data on a day-to-day basis, providing their family doctor with more in-depth information upon which to base a diagnosis, in a continuous rather than a simply discrete form.

In addition, computers are already in abundant application at a great number of hospitals and medical schools in the day-to-day diagnosis of unusual health problems. Probably the best state-of-the-art application to date is the system developed by the Biomathematics Lab at the University of Pittsburgh. This system interacts with the patient to precisely simulate the diagnostic method and medical experience of an actual hospital head-of-residents in internal medicine. Although the state-of-the-art in medical diagnostics is beyond most home programmers' skills and needs, more simplified and sufficiently documented medical self-help and diagnostic programs for family use are certain to be available soon.

The second area where personal computers can be of great benefit to your family's health needs is in the form of resident memory and recall programs. This area is more easily within the reach of home programmers, and the greater limitation here is the memory capacity of your hardware rather than the problem of generating adequate software. Such programming is most often used in the form of handy file and reference systems for fingertip cross-indexing

Keith A. Jones is a research fellow at the Medical College of Pennsylvania, will receive his Ph.D. from Walden University this year, and is the president of MERANDA, a research consultant's consortium.

of possible food and drug reactions, and for printing out first-aid procedures in the event of an emergency.

As for emergency first-aid, most published works on the subject are either booklets too simplistic for real emergencies, or voluminous reference books that can confuse and complicate an emergency. If emergency first-aid procedures are filed on a home microcomputer, such information can be recalled by loading the program, typing in the general area of need, then selecting a specialized area or specifying unique characteristics of the situation.

Microcomputers can also be used in the home to teach emergency first-aid procedures and detection of characteristic food and drug reactions, using programs similar to those used to tutor first-year medical students.

Characteristics of both interactive and direct recall programs are used in the third area where personal computers can help with your overall family health plan. Such programs can implement and maintain regimens of both medically-prescribed and personally designed diet plans, as well as aid in assigning the proper exercise and nutrition for the optimum health of each family member. The possibilities here are wide open. Games could be written to teach younger children proper health and hygiene practice. Menus for optimally nutritious meals could be generated, providing the opportunity for all family members to vote on the alternative meals days ahead. In addition, a program structure such as "The Bob-Up Program", *(Personal Computing,* March, 1978) could be used to remind Mom of the kids' doctor appointment or to go to the supermarket to buy fresh green vegetables and breakfast cereal; to remind Dad to call the local Internal Revenue office about deducting the cost of a medical self-help software package from his income tax; to remind Mary not to drink milk products for at least two hours after taking the antibiotic the doctor prescribed last week; or even to inform the baby-sitter that little Johnny is allergic to orange juice and peanut butter. The most important use of such interactive and recall programs, however is in the maintenance of medically-prescribed diets and regimens, which are a strict necessity in the stabilization of a wide range of chronic conditions.

It should be clear that there's a definite place for the personal computer in the development of your comprehensive family health plan. The number and complexity of medical self-help programs can be as great or as small as your family's unique health needs and range of interests. All the same, it cannot be stressed too strongly that the role of the medically-programmed personal computer should be that of a personal medical advisor rather than a private "physician-in-a-box".

It's important to understand that there is a basic difference between the word "diet" as it is commonly used, and the word "diet" as it is used in the medical sense. In the everyday diet, the overall balance of foods is adjusted as a whole, and each food group is expanded or contracted proportional to every other food group to maintain the normal nutritional balances. In the medical diet, there is a regulation and control of specific nutrients, or of biochemical categories, all the while maintaining the normal level of intake and balance of nutritional food groups.

The medically programmed personal computer should always be regarded as a supplement rather than a substitute for a doctor.

As far as programming goes, the common variety of diet regimen requires calculations involving gross caloric intake, whereas the medical diet involves specific calculations regarding specific nutrients. The medical diet is more complicated than the average diet. Therefore, most of the information necessary to flow-chart a common diet can be taken from a single article or text (regardless of whether the article or book was written by a dietician or a physician), whereas the true medical diet must often be based upon numerous technical articles and texts. Furthermore, it should be stressed that medical diets should be individually prescribed by a physician and written with the direct supervision of a medical professional, and should in no circumstance be undertaken of one's own volition. However, anytime a medical diet is prescribed, a home computer can assist in administering that diet, and most home programmers should be able to write a suitable program implementing the prescribed regimen.

Medical diets and regimens are an intrinsic part of almost every modern medical treatment. Everytime your doctor writes you a prescription, you must watch your diet for potential drug reactions. It's here that the previously noted variety of "bob-up" programs can do the most good, as the seemingly innocuous mixture of many general types of food and drinks with specific drugs can be seriously debilitating or even deadly. Such drug sensitivities are especially crucial in the weeks of home post-operative care, when it may suddenly become important for a doctor to know exactly what foods and drinks have been ingested by a patient. Thus, the home computer can also serve as a revolving journal of a patient's diet and activities for the past few days. Almost every important operation requires some form of medical diet for at least some period, and some operations require a permanent change in diet regimen and lifestyle. In addition, many spontaneous conditions diagnosed require an appropriate medical diet, often in combination with drug therapy. The list here is long, but the most common are vitamin deficiencies, renal insufficiency, hypertension and vascular disorders, cardiac disorders, hyperkinesis, diabetes, epilepsy, and even depression and mild schizophrenia.

Medical diets are the most difficult and delicate level at which a home programmer can integrate into the family comprehensive health plan. But any family that includes a patient under direct medical supervision requiring such a diet could justify a home computer, and all ancillary support services to implement the prescribed programs, as a tax-deductible medical expense. The implementation of such programs should be well within the potential of most home programmers, and certainly worth the effort.

Although many students and recent graduates of medical schools have had training with computers and have acquired considerable programming skills, the average doctor has neither the background nor the time to help debug medical programs. However, the logic flow-charts used to design computer programs are similar to many types of graphic representation used in systemic medical analysis. Probably the best arrangement, once a medical diet has been prescribed, is to write

your program with the assistance of a medical research scientist associated with a medical school or research institute. The scientist can contact your physician and consult him regarding the essential details prescribed by the individual history, then debug the program according to the prescribed specifications. An example of such an individually-designed and debugged program is DIANAT-I, a program for the dietary and medical management of diabetes during pregnancy (See Program Listing.)

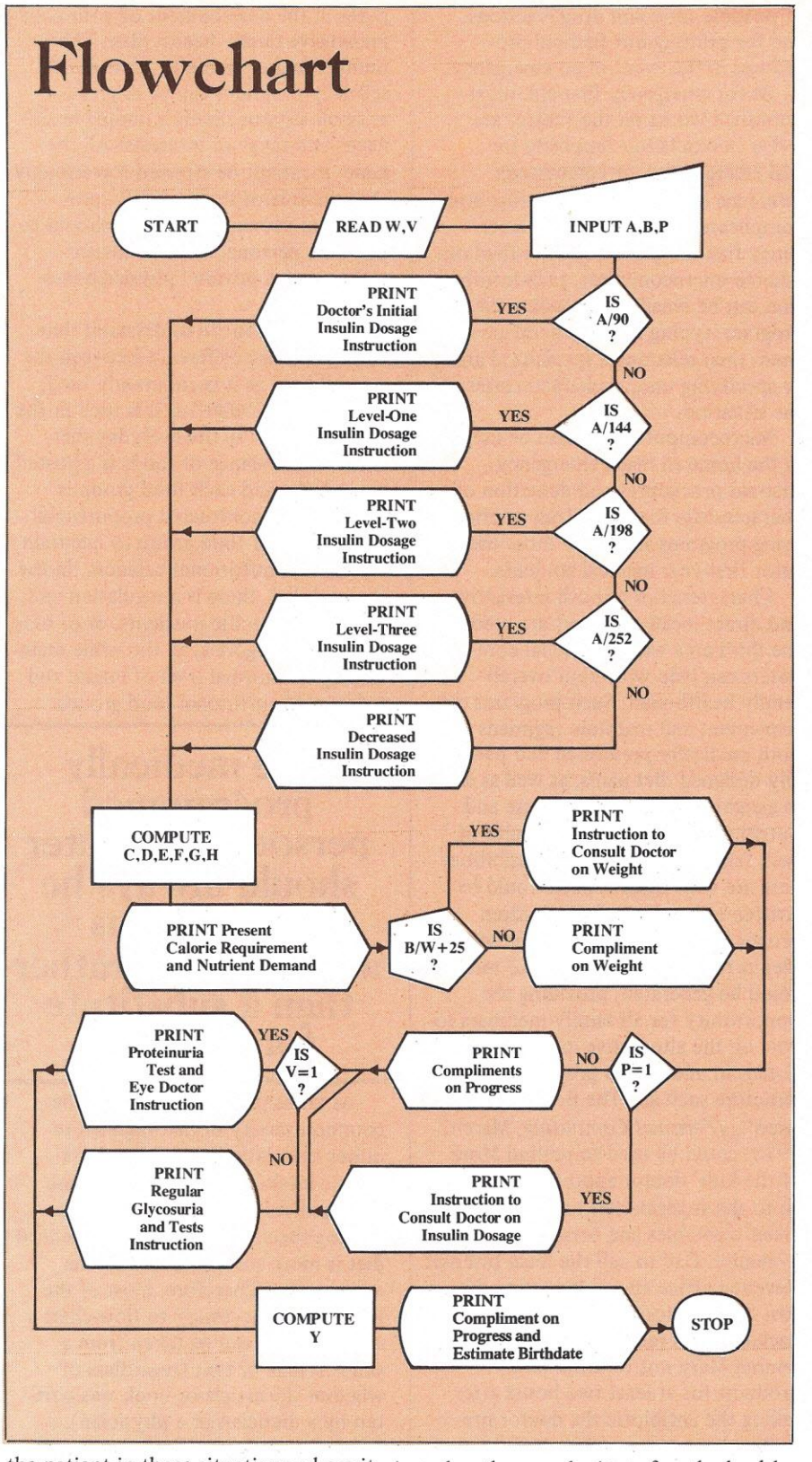
NOTE: This program, DIANAT-I, *is intended as a demonstration only; it is not intended for general use, but only as an example of what can be done by a home programmer with the assistance of a medically-trained research scientist, according to the individual specifications prescribed by a licensed medical practitioner. Diabetes during pregnancy is a relatively rare but serious condition requiring the direct supervision of a doctor. The use of any part of the regimen implemented in this program during the normal pregnancy could easily result in dangerous complications.*

It is essential that any medical self-help program be backed up with sound mechanical facts, and be comprehensive enough to provide for every possible contingency. Any programmer with the time and the motivation can, under a doctor's supervision, write accurate interactive medical programs for every member of the family. There are a number of excellent books by doctors on general medical self-help; most can be found on the supermarket and bookstore paperback bookrack. Most of the more specialized information can be obtained at your local college or public library, and most doctors will be glad to make arrangements for obtaining any more highly technical information than the university library can normally provide.

I cannot stress too strongly that no medical diet or comprehensive health regimen should be undertaken without the ultimate involvement of at least one health professional, and the opportunity for advice and review by your family doctor. The personal medical computer should be regarded as a medical tool rather than a medical entity, and it should never be seriously considered as any kind of substitute for a real doctor. The purpose of a personal computer should be to advise the patient in those situations where it is unnecessary to visit the doctor or when the doctor's advice is needed drastically, but he is temporarily unavailable. However, it should be remembered that even the most extensive medical program is no substitute for the experienced physician when you have a serious problem. Thus, a good medical self-help program should be an extension of, rather than a substitute for, the health regimen that your doctor prescribes for you. It should not incorporate any information resulting in implications you do not fully comprehend. As with all potential computer applications, the greatest benefit is in helping to sort and organize complex processes and to provide specific and detailed information as needed.

Although no competent physician

Flowchart



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CIRCLE 12

would stand in your way, there might be some discomfort at the beginning, about reallocating supervisor responsibility of complicated medical conditions. One alternative is to employ the services of a firm that could provide you with general medical self-help software, and has the medical knowledge to communicate directly with your family doctor to incorporate your individual characteristics into the program structure. Thus, a simple but comprehensive questionnaire could be presented to your physician and, upon receipt of prescription records, medical history and test results, a comprehensive individualized program could be provided, allowing for every contingency regarding the patient's condition.

It may soon be possible to access your home computer by telephone into central time-sharing data-processing systems at a nearby hospital in the event of a medical emergency in the family. The system would immediately evaluate the appropriate individual medical history listing in your personal computer and advise you as to every step of the entire emergency procedure, including not only what to do, but where to go and how to get there. Thus, the family with a personal computer would be assured of the potential for better health and a safer existence. The money that could be saved on ongoing medical expenses such as visits to the doctor's office for information or advice could soon help the home computer to more than pay for itself. There is also the added benefit of possibly deducting the cost of a medically-programmed personal computer and family health software services from your income tax as a necessary medical expense. It should be evident that there is a great potential in the investment of a home computer, when it comes to finances and to the rewards and riches of a happy, healthy life. □

Program Listing

NOTE: This program, DIANAT-I, *is intended as a demonstration only; it is not intended for general use, but only as an example of what can be done by a home programmer with the assistance of a medically-trained research scientist, according to the individual specifications prescribed by a licensed medical practitioner. Diabetes during pregnancy is a relatively rare but serious condition requiring the direct supervision of a doctor. The use of any part of the regimen implemented in this program during the normal pregnancy could easily result in dangerous complications.*

```
009 REM DIANAT-II, A SIMPLE DEMONSTRATION PROGRAM FOR
010 REM   THE MANAGEMENT OF DIABETES DURING PREGNANCY
011 REM COPYRIGHT 1979, MERIDIAN ENTERPRISES, INC.,
012 REM   PROGRAMMED BY KEITH A. JONES, 4/13/1978
013 REM THIS IS AN INFORMATIONAL PROGRAM, AND
014 REM   THEREFORE THE PARAMETERS ARE SET FOR THE
015 REM   GENERAL CASE ONLY.  ANY SPECIAL CONDITIONS
016 REM   WOULD REQUIRE ADJUSTMENT BY THE CONSULTING
017 REM   PHYSICIAN ACCORDING TO THE PRESCRIBED REGIMEN.
018 REM   IN THIS DEMONSTRATION, THE EXPECTANT MOTHER
019 REM   WEIGHED 110 AND WAS PREDIABETIC BEFORE CONCEPTUS.
020 LET W = 110
021 REM   WHERE W = PRECONCEPTUS WEIGHT IN POUNDS
022 LET V = 1
023 REM   WHERE 1 = HISTORY OF DIABETES AND 2 = NO PREVIOUS
024 REM   HISTORY OF A DIABETIC CONDITION
025 PRINT "****************************************"
026 PRINT
027 PRINT "GOOD MORNING.  I TRUST YOU ARE FEELING WELL."
028 PRINT
029 PRINT "I HAVE A FEW QUESTIONS TO ASK CONCERNING YOUR"
030 PRINT "CURRENT CONDITION, SO I CAN GIVE YOU AN IDEA"
031 PRINT "OF YOUR PRESENT INSULIN AND DIET REQUIREMENTS,"
032 PRINT "AND ALSO SO I CAN ADVISE YOU ON A FEW MATTERS."
033 PRINT
034 PRINT "WHAT IS YOUR CURRENT DAY OF TERM? (28-280)";
035 INPUT A
036 PRINT
037 PRINT "WHAT IS YOUR WEIGHT THIS MORNING? (IN LBS.)";
038 INPUT B
039 PRINT
040 PRINT "HAVE YOU NOTICED ANY MINOR SKIN INFECTIONS"
041 PRINT "OR HAD ANY KIDNEY PROBLEMS LATELY?"
042 PRINT "(TYPE 1 FOR YES, 0 FOR NO)";
043 INPUT P
044 PRINT
045 PRINT "THANK YOU."
046 PRINT
047 PRINT "****************************************"
048 PRINT
049 IF A < 90 THEN 058
050 IF A < 144 THEN 061
051 IF A < 198 THEN 065
052 IF A < 252 THEN 070
053 PRINT "IF INSULIN WAS TAKEN BEFORE CONCEPTION,"
054 PRINT "SAME INSULIN REQUIREMENTS AS BEFORE PREGNANCY;"
055 PRINT "IF INSULIN NEVER PREVIOUSLY ADMINISTERED,"
056 PRINT "FOLLOW YOUR PHYSICIAN'S INSTRUCTIONS."
057 GO TO 076
058 PRINT "BE PREPARED TO INCREASE BEFORE-BREAKFAST"
059 PRINT "INTERMEDIATE INSULIN DOSAGE: CONSULT PHYSICIAN."
060 GO TO 076
061 PRINT "BE PREPARED TO INCREASE BEFORE-BREAKFAST"
062 PRINT "INTERMEDIATE AND REGULAR INSULIN INJECTIONS;"
063 PRINT "CONSULT YOUR DOCTOR FOR YOUR PROPER DOSAGE."
064 GO TO 076
065 PRINT "BE PREPARED TO INCREASE BEFORE-BREAKFAST"
066 PRINT "INTERMEDIATE AND REGULAR INSULIN INJECTIONS,"
067 PRINT "AND BEGIN INTERMEDIATE INSULIN INJECTIONS AT"
068 PRINT "BEDTIME; CONSULT YOUR DOCTOR FOR DOSAGE."
069 GO TO 076
070 PRINT "BE PREPARED TO DECREASE INSULIN REQUIREMENTS"
071 PRINT "BY TWENTY TO THIRTY PERCENT.  IF REPEATED"
072 PRINT "HYPOGLYCEMIA NECESSITATES A DOSAGE DROP OF"
073 PRINT "FIFTY PERCENT OR MORE, CHECK WITH YOUR DOCTOR"
074 PRINT "CONCERNING POSSIBLE COMPLICATIONS.  ALSO, BE"
075 PRINT "PREPARED FOR AN EARLY DELIVERY ANY DAY NOW."
076 PRINT
077 PRINT "****************************************"
078 PRINT
079 LET C = B * 16.36
080 LET D = C * 0.11
081 LET E = B * 0.9
082 LET F = E * 2.5
083 LET G = D * 4.0
084 LET H = C - (F - G)
085 PRINT "YOUR DIETARY REQUIREMENTS PRESENTLY TOTAL"
086 PRINT "ABOUT ";C;" CALORIES PER DAY."
087 PRINT
088 PRINT "****************************************"
089 PRINT
090 PRINT "OF THOSE ";C;" CALORIES, THERE SHOULD BE"
091 PRINT D;" GRAMS OF CARBOHYDRATE,"
092 PRINT "WHICH ACCOUNTS FOR ABOUT ";G;" CALORIES;"
093 PRINT "THERE SHOULD BE ";E;" GRAMS OF PROTEIN,"
094 PRINT "WHICH ACCOUNTS FOR ANOTHER ";F;" CALORIES; AND"
095 PRINT "THERE SHOULD BE FATS AND OILS EQUAL TO ";H;
096 PRINT "CALORIES, WHICH ACCOUNTS FOR THE REST."
097 PRINT
098 PRINT "****************************************"
099 PRINT
100 IF B > W + 25 THEN 104
101 PRINT "GOOD WORK.  YOU ARE KEEPING YOUR WEIGHT
102 PRINT "WELL WITHIN PRESCRIBED LIMITS."
103 GO TO 108
104 PRINT "YOUR WEIGHT MAY BE JUST A LITTLE BIT HIGH."
105 PRINT "YOU SHOULD CONSULT WITH YOUR DOCTORS; THEY MAY"
106 PRINT "WANT YOU TO TEMPORARILY ADJUST YOUR DIET"
107 PRINT "AND INSULIN DOSAGE REGIMEN."
108 PRINT
109 PRINT "****************************************"
110 PRINT
111 IF P = 0 THEN 118
112 PRINT "YOU SHOULD BE CAREFUL TO FOLLOW YOUR REGIMEN, AND"
113 PRINT "YOU SHOULD CHECK WITH YOUR DOCTOR IMMEDIATELY,"
114 PRINT "AS THERE IS THE POSSIBILITY OF A MANAGEMENT"
115 PRINT "DIFFICULTY.  YOUR DOCTOR MAY WANT TO ALTER YOUR"
116 PRINT "INSULIN DOSAGE, OR YOUR DOCTOR MAY WANT TO"
117 PRINT "PRESCRIBE AN APPROPRIATE ANTIBIOTIC."
118 PRINT "EVERYTHING ELSE SEEMS FINE."
119 PRINT
120 PRINT "****************************************"
121 PRINT
122 IF V = 0 THEN 131
123 PRINT "TAKE CARE TO PROTECT YOUR EYESIGHT AND"
124 PRINT "DON'T FORGET TO GO TO YOUR EYE DOCTOR FOR YOUR"
125 PRINT "OPHTHALMOSCOPIC EXAM FOR RETINOPATHY THIS WEEK."
126 PRINT
127 PRINT "DON'T FORGET YOUR REGULAR TEST FOR PROTEINURIA."
128 PRINT
129 PRINT "****************************************"
130 PRINT
131 PRINT "REMEMBER TESTS FOR GLYCOSURIA, PYURIA, AND BACTERURIA."
132 PRINT
133 PRINT "IF YOUR GLYCOSURIA LEVEL IS GREATER THAN ABOUT"
134 PRINT "ONE OR TWO PERCENT, TEST FURTHER WITH A TABLET"
135 PRINT "FROM YOUR ACETEST KIT TO DETERMINE FOR THE"
136 PRINT "PRESENCE OF ACETONE."
137 PRINT
138 PRINT "IF ACETONE IS PRESENT IN USUSUAL AMOUNTS,"
139 PRINT "TAKE IMMEDIATE STEPS TO PREVENT KETOACIDOSIS,"
140 PRINT "AS INSTRUCTED BY YOUR DOCTOR."
141 PRINT
142 PRINT "****************************************"
143 PRINT
144 LET Y = 266 - A
145 PRINT "THANK YOU.  THAT'S ALL FOR NOW.  HAVE"
146 PRINT "A NICE DAY.  AND SMILE.  YOUR BABY IS"
147 PRINT "DUE IN LESS THAN ";Y;" DAYS!"
148 PRINT
149 PRINT "****************************************"
150 END
```

Sample Run

```
****************************************

GOOD MORNING.  I TRUST YOU ARE FEELING WELL.

I HAVE A FEW QUESTIONS TO ASK CONCERNING YOUR
CURRENT CONDITION, SO I CAN GIVE YOU AN IDEA
OF YOUR PRESENT INSULIN AND DIET REQUIREMENTS,
AND ALSO SO I CAN ADVISE YOU ON A FEW MATTERS.

WHAT IS YOUR CURRENT DAY OF TERM? (28-280);
255;

WHAT IS YOUR WEIGHT THIS MORNING? (IN LBS.);
125;

HAVE YOU NOTICED ANY MINOR SKIN INFECTIONS
OR HAD ANY KIDNEY PROBLEMS LATELY?
(TYPE 1 FOR YES, 0 FOR NO);
1;

THANK YOU

****************************************

BE PREPARED TO DECREASE INSULIN REQUIREMENTS
BY TWENTY TO THIRTY PERCENT.  IF REPEATED
HYPOGLYCEMIA NECESSITATES A DOSAGE DROP OF
FIFTY PERCENT OR MORE, CHECK WITH YOUR DOCTOR
CONCERNING POSSIBLE COMPLICATIONS.  ALSO, BE
PREPARED FOR AN EARLY DELIVERY ANY DAY NOW.

****************************************

YOUR DIETARY REQUIREMENTS PRESENTLY TOTAL
ABOUT 2045 CALORIES PER DAY.

****************************************

OF THOSE 2045 CALORIES, THERE SHOULD BE
225 GRAMS OF CARBOHYDRATE,
WHICH ACCOUNTS FOR ABOUT 900 CALORIES;
THERE SHOULD BE 113 GRAMS OF PROTEIN,
WHICH ACCOUNTS FOR ANOTHER 281 CALORIES; AND
THERE SHOULD BE FATS AND OILS EQUAL TO 894
CALORIES, WHICH ACCOUNTS FOR THE REST.

****************************************

GOOD WORK.  YOU ARE KEEPING YOUR WEIGHT
WELL WITHIN YOUR PRESCRIBED LIMITS.

****************************************

YOU SHOULD BE CAREFUL TO FOLLOW YOUR REGIMEN, AND
YOU SHOULD CHECK WITH YOUR DOCTOR IMMEDIATELY,
AS THERE IS THE POSSIBILITY OF A MANAGEMENT
DIFFICULTY.  YOUR DOCTOR MAY WANT TO ALTER YOUR
INSULIN DOSAGE, OR YOUR DOCTOR MAY WANT TO
PRESCRIBE AN APPROPRIATE ANTIBIOTIC.
EVERYTHING ELSE SEEMS FINE.

****************************************

TAKE CARE TO PROTECT YOUR EYESIGHT AND
DON'T FORGET TO GO TO YOUR DOCTOR FOR YOUR
OPHTHALMOSCOPIC EXAM FOR RETINOPATHY THIS WEEK.

DON'T FORGET YOUR REGULAR TEST FOR PROTEINURIA.

****************************************

REMEMBER TESTS FOR GLYCOSURIA, PYRURIA,
AND BACTERURIA.

IF YOUR GLYCOSURIA LEVEL IS GREATER THAN ABOUT
ONE OR TWO PERCENT, TEST FURTHER WITH A TABLET
FROM YOUR ACETEST KIT TO DETERMINE FOR THE
PRESENCE OF ACETONE.

IF ACETONE IS PRESENT IN UNUSUAL AMOUNTS,
TAKE IMMEDIATE STEPS TO PREVENT KETOACIDOSIS,
AS INSTRUCTED BY YOUR DOCTOR.

****************************************

THANK YOU.  THAT'S ALL FOR NOW.  HAVE
A NICE DAY.  AND SMILE.  YOUR BABY IS
DUE IN LESS THAN 11 DAYS.

****************************************
```


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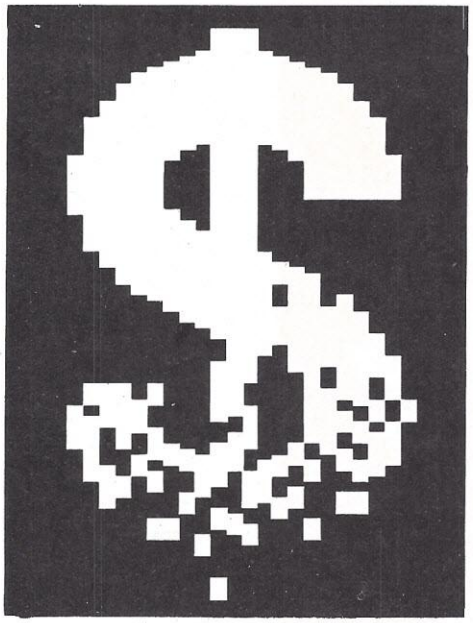
CIRCLE 13

Appreciating Depreciation

BY KAREN S. WOLFE



Declining Balance, Sum-of-the-Years-Digits and Straight Line—these terms give businessmen nightmares in the realm of depreciation allowances. Which of these methods will most benefit a company over the expected life of the depreciable item?

To answer the question, you must calculate the actual depreciation allowances for the years involved and compare the results of the various methods. This DEPRECIATION program provides a quick way of calculating depreciation schedules using any of the above mentioned methods.

The program is written in North Star BASIC, with multiple statement lines separated by "\". Hardcopy of the depreciation schedules is the end result of the program. Statement lines 1060 and 1250 are my system's commands to select the printer and to select the monitor, respectively. Your system's commands are undoubtedly different and should be substituted in those statement lines. If you don't have a printer, just substitute a PRINT command into those lines for spacing purposes and the results will appear on the monitor.

We will use the same example problem for each depreciation method to show the variation between the methods. Suppose you just purchased a new sheetmetal slitter and the related information is as follows:

Cost: $1,000
Salvage Value: $50
Expected Life: 4 years
Date to begin depreciation: September 1978

Load the DEPRECIATION program and RUN/EXECUTE. Enter data as requested and as illustrated in the sample run. The operator inputs, or data inputs, are underlined in the sample. Enter the company name, the item description, the year of purchase and the number of the month to begin depreciation.

This program will calculate the schedule on either a calendar or a fiscal accounting year basis, whichever you select. In our sample, we enter "1" for a calendar year accounting period.

Next, input the expected life of the item (in years), the purchase price and the salvage value. The program then gives the following prompt: TAKE BONUS 1ST YEAR DEPRECIATION? (Y/N). This question requires a yes ("Y") or a no ("N") answer. Under certain circumstances, the IRS allows a bonus first year depreciation of 20%. You should consult your accountant or the IRS to see if your circumstances will allow your taking this bonus. In our example, the bonus cannot be taken because the expected life is only 4 years for the slitter but at least a 6 year life is necessary to receive the bonus depreciation (as of this writing).

Next, the depreciation methods are listed and we are prompted to select one. On this first pass, we will use the straight line method, so we input "1" The program lets us know that the calculations are being performed; then it prompts us to prepare the printer for action and enter "1" to continue.

The entire depreciation schedule for the item is presented, including the total accumulated depreciation and the remaining book value at the end of each accounting period. If the company is on a fiscal year basis, the year printed in the schedule will be the ending year of the period. For example, for FY '77-'78 the program will print 1978.

At the end of the printout, the program returns to the monitor and asks if you desire to calculate another schedule. If you do, enter "Y" and the program will loop back to the prompt for the item description. To follow this example, enter the data just as before, but this time select the Sum-of-the-Years-Digits method by entering "2" for the appropriate prompt.

You can see that the S-Y-D method provides an accelerated depreciation schedule. (The sample runs show the depreciation schedules for the S-Y-D and the Declining Balance methods but do not show the data entry, which is the same as in the Straight Line run, except, of course, for the selection of the depreciation method.)

Now, run the program again but use the Declining Balance calculation. This is another accelerated schedule and the program uses the double declining balance formula. The depreciation rate is twice what the rate would be using the Straight Line method. Most people can use this formula, but it is always a good idea to check with your accountant or the IRS. If for any reason you require a different rate (or the law changes), you can change line 830 and replace the "2" with whatever factor is required.

With the completion of this last run, you have three depreciation schedules to compare. The final choice as to which is optimal for your business is still yours to make; but at least the hassle of calculating the schedules is lessened by the DEPRECIATION program.

A brief description of the three calcu-

Illustration by David Bastille

lation methods is in order at this time, although this article does not seek to be a textbook presentation for depreciation methods. Consult an accounting text for full explanations.

Let's assume the following situation and list the appropriate results from the three methods. You have purchased a tool for $1000, its salvage value is $100, its life is 4 years and it was purchased in January (you are on a calendar year basis so you receive an entire twelve months of depreciation in the first accounting period.)

The Straight Line method is the simplest: (1000-100)/4 = 225 per year. The "rate" of depreciation is ¼ = .25, or 25% per year.

The Declining Balance method uses twice the straight line rate in its calculations. The first year's calculation is as follows: 1000 x .50 = 500. The second year would be: 1000 - 500 = 500; then, 500 x .50 = 250. The third year would be: 500 − 250 = 250; then, 250 x .50 = 125. Now, we have written off a total of 500 + 250 + 125 = 875 in depreciation in the first three years. Since the book value cannot fall below 100 (salvage), we can write off only $25 in the last year.

In the Sum-of-the-Years-Digits method, you sum the digits between 1 and the number of years of expected life. In our example, the life is 4 years; therefore, sum: 1 + 2 + 3 + 4 = 10. Then, the first year's depreciation is: (1000 − 100) x (4/10) = 360. The second year's depreciation would be: (1000 − 100) x (3/10) = 270. The third year would be: (1000 - 100) x (2/10) = 180. Now, the total depreciation taken is 360 + 270 + 180 = 810 in the first three years. Since book value cannot fall below salvage value, the last year's depreciation will be $90, which makes total depreciation over the four years $900.

This program has incorporated safeguards so that the book value does not fall below the salvage value in the last accounting period. Of course, the depreciation allowance in that last period is adjusted accordingly.

One final word of warning: stay informed of IRS regulation changes that might affect the way you must calculate depreciation. After all, pleasing Uncle Sam seems to be the major reason for our appreciaton of DEPRECIATION. □

Program Listing

This program prints depreciation schedules using three popular methods, saving you time and money.

```
10 DIM S(30), A$(1), L$(50), N$(50),  A(30),B(30), J$(1)
20 PRINT\ PRINT\ PRINT\ PRINT
30 PRINT "     DEPRECIATION CALCULATION PROGRAM"
40 PRINT\ PRINT\ PRINT\ PRINT
50 INPUT "  ENTER NAME OF COMPANY ", N$ \ PRINT
60 INPUT "  ENTER DESCRIPTION OF ITEM TO BE DEPRECIATED ", L$ \ PRINT
62 FOR C = 1 TO 30
64 LET S(C) = 0 \ LET A(C) = 0 \ LET B(C) = 0
66 NEXT C
70 INPUT "  ENTER THE YEAR OF PURCHASE ", Y3 \ PRINT
80 PRINT"     1. JANUARY              7. JULY"
90 PRINT"     2. FEBRUARY             8. AUGUST"
100 PRINT"    3. MARCH                9. SEPTEMBER"
110 PRINT"    4. APRIL                10. OCTOBER"
120 PRINT"    5. MAY                  11. NOVEMBER"
130 PRINT"    6. JUNE                 12. DECEMBER" \ PRINT
140 INPUT"  SELECT MONTH TO BEGIN DEPRECIATION (ENTER NO.) ",M3 \ PRINT
150 PRINT"    1. CALENDAR             2. FISCAL" \ PRINT
160 INPUT"  SELECT ACCOUNTING PERIOD (ENTER NO.) ",A1 \ PRINT
170 IF A1 = 1 THEN 215
180 IF M3 < 7 THEN 210
190 LET Y = Y3 +1
200 LET M = M3-6 \ GOTO 220
210 LET M = M3+6\ GOTO 217
215 LET M = M3
217 LET Y = Y3
220 INPUT "  ENTER NO. OF YEARS OVER WHICH ITEM IS TO BE DEPREC. ", N \ PRINT
230 INPUT "  ENTER TOTAL PURCHASE PRICE OF ITEM ", T2\ PRINT
240 INPUT "  ENTER SALVAGE VALUE OF ITEM ", S \ PRINT
242 INPUT "  TAKE BONUS 1ST YEAR DEPRECIATION? (Y/N) ",J$
244 IF J$ = "N" THEN 248
245 LET B = T2 * .2
246 LET T = T2 - B
247 GOTO 250
248 LET T = T2
249 LET B = 0
250 PRINT\ PRINT
260 PRINT "        DEPRECIATION METHOD OPTIONS:" \ PRINT
270 PRINT "             1. STRAIGHT LINE "
280 PRINT "             2. SUM-OF-THE-YEARS-DIGITS"
290 PRINT "             3. DECLINING BALANCE"
300 PRINT
310 INPUT "        SELECT 1, 2 OR 3 ", K \ PRINT
320 PRINT\ PRINT\ PRINT\ PRINT\ PRINT\ PRINT
330 PRINT "           ********** CALCULATIONS **********"
340 PRINT\ PRINT\ PRINT\ PRINT\ PRINT\ PRINT
350 LET V= T-S \ LET N1= (12-M) + 1
360 ON K GOTO 370, 530, 820
370 LET V1 = V/N
380 LET F= (V1/12)*N1
390 LET S(1) = F \ LET A(1) = F
400 LET B(1) = T - A(1)
410 FOR C = 2 TO N
420 LET S(C) = V1
430 LET A(C) = A(C-1) + S(C)
440 LET B(C) = T - A(C)
450 IF A(C) > V THEN 470
460 NEXT C
470 LET S(C) = V - A(C-1)
480 LET A(C) = A(C-1) + S(C)
490 LET B(C) = T - A(C)
520 GOTO 1030
530 LET S1= 0
540 FOR C = 1 TO N
550 LET S1 = S1 + C
560 NEXT C
570 LET T1 = (N/S1)*V
590 LET L = (T1 / 12) * N1
600 LET S(1) = L
610 LET A(1) = S(1)
620 LET B(1) = T - A(1)
630 LET C1 = 2
640 FOR C = N-1 TO 1 STEP -1
650 LET F = T1 - L
660 LET T1 = (C/S1) * V
670 LET L = (T1 / 12) * N1
680 LET S(C1) = L + F
```

Program Listing continued

```
690 LET A(C1) = A(C1-1) + S(C1)
700 LET B(C1) = T - A(C1)
710 IF A(C1) > V THEN 780
720 LET C1 = C1 + 1
730 NEXT C
740 LET S(C1) = T1 - L
750 LET A(C1) = A(C1-1) + S(C1)
760 LET B(C1) = T - A(C1)
770 GOTO 1030
780 LET S(C1) = V - A(C1-1)
790 LET A(C1) = A(C1-1) + S(C1)
800 LET B(C1) = T - A(C1)
810 GOTO 1030
820 LET G=0
830 LET R = (1/N) * 2
840 LET T1 = T*R
850 LET L = (T1/12) * N1
860 LET S(1) = L
870 LET A(1) = S(1)
880 LET B(1) = T - A(1)
890 FOR C = 2 TO N
900 LET F = T1 - L
910 LET G = G + T1
920 LET T1 = (T - G) * R
930 LET L = (T1/12) * N1
940 LET S(C) = L + F
950 LET A(C) = A(C-1) + S(C)
960 LET B(C) = T - A(C)
980 NEXT C
990 IF N1 = 12 THEN 1020
995 LET S(N+1) = (T - S) - A(N)
1000 LET A(N+1) = S(N+1) + A(N)
1010 LET B(N+1) = T - A(N+1)
1015 GOTO 1030
1020 LET S(N) = (T - S) - A(N-1)
1022 LET A(N) = A(N-1) + S(N)
1024 LET B(N) = T - A(N)
1030 PRINT\ PRINT\ PRINT\ PRINT
1040 INPUT "  TURN PRINTER ON--ENTER 1 TO CONTINUE ", A
1050 IF A = 1 THEN 1060 \ GOTO 1040
1060 FILL 10510,195
1070 PRINT \ PRINT
1080 PRINT "COMPANY: ",N$
1090 PRINT"DEPRECIATION SCHEDULE FOR: ",L$ \ PRINT
1100 PRINT "COST: ",T2, TAB(30),"SALVAGE: ",S
1110 PRINT "BEG. DEPREC.: ",M3,"/",Y3, TAB(30),"LIFE: ",N," YEARS"
1120 PRINT "DEPREC. VALUE: ",V, TAB(30),"METHOD: ",
1130 ON K GOTO 1140, 1150, 1160
1140 PRINT "STRAIGHT LINE"\ GOTO 1162
1150 PRINT "SUM-OF-THE-YEARS-DIGITS" \ GOTO 1162
1160 PRINT "DECLINING BALANCE"
1162 IF B = 0 THEN 1170
1165 PRINT "1ST YEAR BONUS DEPRECIATION: ",%9F2,B
1170 PRINT\ PRINT
1180 ON A1 GOTO 1190, 1200
1190 PRINT"CALENDAR" \ GOTO 1210
1200 PRINT" FISCAL"
1210 PRINT"  YEAR    YRLY. DEPREC.   ACCUM. DEPREC.   BK VALUE" \PRINT
1220 FOR C = 1 TO N+1
1230 PRINT" ",Y+ (C-1),%15F2,S(C),%18F2,A(C),%13F2,B(C)
1240 NEXT C
1250 FILL 10510,202
1260 PRINT\ PRINT\ PRINT\ PRINT
1270 INPUT"DO YOU WISH TO CALCULATE DEPREC. FOR ANOTHER ITEM (Y/N)? ",A$
1280 IF A$ = "Y" THEN 60 \ IF A$= "N" THEN 1290 \ GOTO 1270
1290 END
```

Sample Run

```
   DEPRECIATION CALCULATION PROGRAM

ENTER NAME OF COMPANY XYZ CORP.

ENTER DESCRIPTION OF ITEM TO BE DEPRECIATED SLITTER

ENTER THE YEAR OF PURCHASE 1978

  1. JANUARY              7. JULY
  2. FEBRUARY             8. AUGUST
  3. MARCH                9. SEPTEMBER
  4. APRIL               10. OCTOBER
  5. MAY                 11. NOVEMBER
  6. JUNE                12. DECEMBER

SELECT MONTH TO BEGIN DEPRECIATION (ENTER NO.) 9

  1. CALENDAR             2. FISCAL

SELECT ACCOUNTING PERIOD (ENTER NO.) 1

ENTER NO. OF YEARS OVER WHICH ITEM IS TO BE DEPREC. 4

ENTER TOTAL PURCHASE PRICE OF ITEM 1000

ENTER SALVAGE VALUE OF ITEM 50

TAKE BONUS 1ST YEAR DEPRECIATION? (Y/N) N

     DEPRECIATION METHOD OPTIONS:

          1. STRAIGHT LINE
          2. SUM-OF-THE-YEARS-DIGITS
          3. DECLINING BALANCE

     SELECT 1, 2 OR 3 1


        ********** CALCULATIONS **********


TURN PRINTER ON--ENTER 1 TO CONTINUE  1
```

Printouts

```
COMPANY: XYZ CORP.
DEPRECIATION SCHEDULE FOR: SLITTER

COST:  1000                    SALVAGE:  50
BEG. DEPREC.:  9/ 1978         LIFE:  4 YEARS
DEPREC. VALUE:  950            METHOD: STRAIGHT LINE


CALENDAR
  YEAR     YRLY. DEPREC.    ACCUM. DEPREC.    BK VALUE

  1978          79.17             79.17         920.83
  1979         237.50            316.67         683.33
  1980         237.50            554.17         445.83
  1981         237.50            791.67         208.33
  1982         158.33            950.00          50.00

DO YOU WISH TO CALCULATE DEPREC. FOR ANOTHER ITEM (Y/N)? Y


COMPANY: XYZ CORP.
DEPRECIATION SCHEDULE FOR: SLITTER

COST:  1000                    SALVAGE:  50
BEG. DEPREC.:  9/ 1978         LIFE:  4 YEARS
DEPREC. VALUE:  950            METHOD: SUM-OF-THE-YEARS-DIGITS


CALENDAR
  YEAR     YRLY. DEPREC.    ACCUM. DEPREC.    BK VALUE

  1978         126.67            126.67         873.33
  1979         348.33            475.00         525.00
  1980         253.33            728.33         271.67
  1981         158.33            886.67         113.33
  1982          63.33            950.00          50.00

DO YOU WISH TO CALCULATE DEPREC. FOR ANOTHER ITEM (Y/N)? Y


COMPANY: XYZ CORP.
DEPRECIATION SCHEDULE FOR: SLITTER

COST:  1000                    SALVAGE:  50
BEG. DEPREC.:  9/ 1978         LIFE:  4 YEARS
DEPREC. VALUE:  950            METHOD: DECLINING BALANCE


CALENDAR
  YEAR     YRLY. DEPREC.    ACCUM. DEPREC.    BK VALUE

  1978         166.67            166.67         833.33
  1979         416.67            583.33         416.67
  1980         208.33            791.67         208.33
  1981         104.17            895.83         104.17
  1982          54.17            950.00          50.00
```

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CIRCLE 14

Part 2

TAX BASE

BY PAUL HOLLIDAY

This TAX program files income tax data on disk for rapid, convenient retrieval, and prints daily and year-end reports to help you prepare income tax forms. Part 1 of this article, published last month, described how to use the two programs, TAX.BAS and TAX2.BAS, which make up the TAX package, and included a program listing for TAX.BAS.

This second article examines program organization, file structure and error handling, and includes Program Listing 2 (TAX2.BAS), a sample data base and suggestions for modifying and adapting the TAX programs.

(If you don't have the April *PC*, which contained Part 1, you can order it by sending $3 to Circulation Director, *Personal Computing*, 1050 Commonwealth Ave., Boston, MA 02215.)

Program Organization and Line Numbers

Line numbers are not duplicated or reused between the individual programs to provide for easy maintenance and changes. There are several advantages to this technique. First, if sufficient memory is available, both programs can be put together and compiled as one program without major reorganization. While it is usually better to build programs in small modules, BASIC-E or the CP/M Operating System does not provide for program linking or chaining at load time. The lack of a chain function is a major disadvantage since it makes it necessary to duplicate much of the code when programs are separated. Normally, without very strict control of line numbers and subroutines, this drawback would result in generally unstructured coding. Given these limitations, you may be better off in this case to build one large program. Secondly, the same routines can be used for other programs, again without major modifications.

Table 1 describes the program line numbers currently used. Line numbers not listed or referenced can be used as necessary. However, it's best if the program structure is followed as modules or subroutines are added. That is, you should try to keep related routines together, similar to the grouping shown in Table 1.

Data Base Organization and File Structure

The data base consists of two files, a directory file (file type .DIR), and a data file (file type .FIL). The default names for these files are set at TAXDATA.DIR and TAXDATA.FIL for directory and data files, respectively. The names may be changed easily within the program by defining the strings DEFAULT1$ and DEFAULT2$ (see program listings). In addition, the current file names may be changed when the program is run by using the CHANGE function (described in Part 1) to redefine the file names for that run. Once the name has been changed, it remains at that value for the remainder of the run. Note also that the directory file name is always made identical to the data file name except that its file type is .DIR.

File organization is depicted in Figure 11. In the program listings, refer to line numbers 6100 through 6230 for details of the fields contained within each data record. Several dummy fields in all records provide for possible expansion and change. These fields are named DUM and DUMMY$ for numeric and string dummies, respectively. If you wish to add or define a new field, replace one of the dummy fields with the new name, using the correct type (numeric or string). This way, all previous files will still be usable with the new (or later) version.

Another technique used for the file handling procedures is to define the

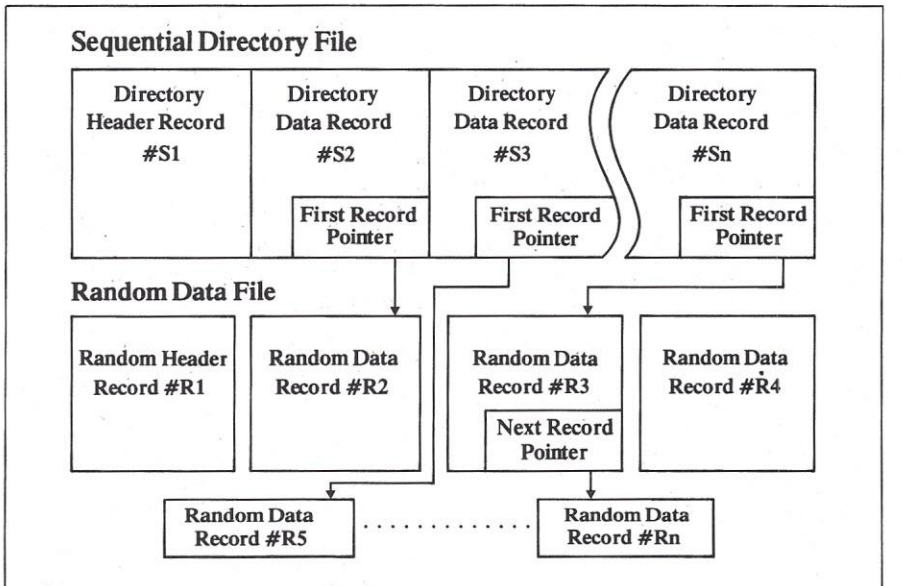


Figure 11 File organization for TAX programs

PRINT and READ statements which control file accesses in only one place. A subroutine call (GOSUB. . .) is then used each time you need a file read or write operation. This technique makes it fairly easy to change the format of the records and consequently the file structure without having to change a large number of statements sprinkled throughout the program.

Sequential and Random Files (Records)

See Figure 11. Directory records 2 through N contain a name (ITEMNAMEX$) and a pointer (FIRSTRECORDX) to the first record of data in the chain. The data records are in a separate file, named TAXDATA.FIL for this version.

Each data record in the file contains a NEXTRECORDX field which points to the next data record in the chain. If NEXTRECORDX is zero on the random data record, then that was the last record in the chain.

When a record is added, the next random data record available is obtained from the random file header record #R1 (RCNTX), the previous pointer on the data record (NEXTRECORDX) is set to point to that record (NEXTRECORDX=RCNTX), and the directory header record is updated.

Modifying the Program

Making modifications to the program to tailor it for your particular system should be a relatively straightforward task. All of the important variables and constants are defined in the equate dictionaries at the beginning of each program. For example, to change the CLEAR SCREEN code for your monitor, see the section in the program listings labeled CONSOLE OR HARDWARE DEPENDENT EQUATES. Change the instruction CLEAR=CTLD to whatever code your monitor uses to clear the screen. If you don't want this feature, then you can make CLEAR=32 (32 is an ASCII blank). This change will cause a blank character to be printed whenever the clear screen subroutine is called, essentially nulling the function. You can do the same for the PAGE and SPEED equates to print blanks instead of the code initially set up in the equate dictionary.

If you don't have a printer, see the section in the program listings labeled VARIABLES AND CONSTANTS, and change PRINTER=1 to PRINTER=0. The random data record size can also be changed by changing RSIZE=256 to whatever block length you desire. Use

```
          -MAIN SUBROUTINES (CALLS FROM MENU)-
LINE#     DESCRIPTION

1000      ADD       TO ADD A NEW CATEGORY TO DATA BASE
1100      ENTER     TO ENTER DATA FOR AN EXISTING CATEGORY
1200      HELP      TO GET MORE INSTRUCTIONS
1300      LIST      TO LIST THE FILES
1400      CREATE    TO CREATE A NEW DATA BASE
1500      FIND      NOT IMPLEMENTED YET
1600      OPT       TO SET OR CHANGE OPTIONS
1700      CHANGE    TO CHANGE FILENAMES FOR THIS RUN
1800      DELETE    TO DELETE A CATEGORY (NAME) FROM DIR
1900      PRINT     TO PRINT REPORTS OF TAX DATA
2000      PRINTC    TO PRINT (LIST) CATEGORIES IN DIRECTORY
2100
2900      2100-2900 RESERVED FOR FUTURE FUNCTIONS

3000      NOT HERE, RUN TAX.BAS
3010      NOT HERE, RUN TAX2.BAS

          -COMMON ROUTINES AND PRINT LINES-
5000      CLEAR SCREEN,RESET TO TOP,SET VECTOR SPEED=FAST
5010      PRINT"ENTER 999 OR Q TO QUIT OR STOP"
5020      PRINT"ENTER ZERO OR SPACE FOR NO CHANGE"
5030      PRINT"CTRL-C TO EXIT THIS PROGRAM"
5040
          -FILE PRIMITIVES, OPEN/CLOSE FILES-
6000      OPEN SEQUENTIAL FILE
6050      OPEN RANDOM FILE
6095      CLOSE ALL OPENED FILES
          -FILE PRIMITIVES, SEQUENTIAL FILES-
6100      WRITE SEQUENTIAL DIRECTORY HEADER RECORD (#1)
6110      READ SEQUENTIAL DIRECTORY HEADER RECORD (#1)
6120      WRITE SEQUENTIAL DIRECTORY DATA RECORD (#2-N)
6130      READ SEQUENTIAL DIRECTORY DATA RECORD (#2-N)
          -FILE PRIMITIVES, RANDOM ACCESS FILES-
6200      WRITE RANDOM FILE HEADER RECORD (#1)
6210      READ RANDOM FILE HEADER RECORD (#1)
6220      WRITE RANDOM FILE DATA RECORD (#2 TO N)
6230      READ RANDOM FILE DATA RECORD (#2 TO N)
          -FILE FUNCTIONS-
7000      DELETED
7010      DELETED
7050      SETUP,OPEN FILE, READ DIRECTORY HEADER
7100      RE-WRITE RANDOM FILE HEADER RECORD
7120      RE-WRITE PREVIOUS DATA RECORD
7140      WRITE NEXT DATA RECORD

7800      PRINT CONTENTS OF SEQUENTIAL HEADER RECORD
7805      PRINT CONTENTS OF SEQUENTIAL DATA RECORD
7810      PRINT CONTENTS OF RANDOM HEADER RECORD
7815      PRINT CONTENTS OF RANDOM DATA RECORD
7820
7830      PRINT CURRENT DEFAULT FILE NAME,ALLOW CHANGE
7840
7850      SET FILENAME1$ AND ADD .DIR
7860      PRINT CURRENT FILENAMES (.DIR AND .FIL)
7870      PRINT TITLE LINE FOR DATA RECORDS
7890      PRINT DATA RECORDS
7920      INPUT DATE, DESCRIPTION, AMOUNT
7940      INPUT CATEGORY (FILING NAME FOR DIRECTORY)
7960      SET LENGTH OF STRING IF '*' ENTERED
7980
8000      PRINT 'ITEM NAME NOT FOUND..' AND CLOSE FILES
8010      PRINT 'DATA BASE TITLE =...'
8020      PRINT 'EXISTING CATEGORY NAMES FOR....'
8050      PRINT CURRENT OPTIONS FLAGS

          -FILE HANDLING ROUTINES-
8100      INPUT DATE AND START A NEW FILE

          -ERROR PROCESSING-
9000      GENERAL FILE ERROR, READ,WRITE, OR OPEN

          -MISC INPUT AND EXIT ROUTINES-
9200      CHECK FOR QUIT (A OR A$)
9201      INPUT NUMERIC AND CHECK FOR QUIT (A)
9202      INPUT ALPHA AND CHECK FOR QUIT (A$)
9220      'ENTER ANYTHING TO CONTINUE' (WAITS FOR OPER)

9900      'QUIT' PROGRAM ENTERED BY OPERATOR
9990      FINAL EXIT
9991      FINAL EXIT (PRIMITIVE)
```

Table 1 **Program Line Numbers for TAX.BAS and TAX2.BAS**

```
TYPE SOMETHING:? Q

QUIT OR RESTART (Q OR R)? Q

FREE BYTES AT END=991
TAX.BAS VERSION V1.7,19AUG78 FINISHED.
```

Figure 12 Example of 'Q' entry to quit

```
PRINT - PRINTS REPORTS OF TAX DATA FILES

USE 'OPT' TO TURN PRINTER ON OR OFF,

WHAT IS CATEGORY OR NAME DESIRED? ZEBRA

SEARCHING DIRECTORY FOR: 'ZEBRA'

READ FILE ERROR...
FILE NUMBER (FILENMBR)=1
CURRENT FILE (FILENAME$) IS: NAMES.DIR
RECNMBR=2
RNMBR=1
RCNTX=0
CHECK DISK DIR TO SEE IF FILE EXISTS

ENTER ANYTHING TO CONTINUE:?
```

User changed file name and then PRINTed; but there's no such name on disk because file was not created.

Figure 13 Error example

caution when changing the block length because you may not be able to read previous files if you do so.

Conversion to Other BASICs

Converting the TAX programs from BASIC-E to other versions of BASIC may or may not be difficult, depending upon the editor and/or utilities you have available. Note that the major difference between BASIC-E and other BASICs is that line numbers are not required on every statement in a BASIC-E program. This feature allows you to move routines around from program to program without major revision. It also helps when you are trying to utilize structured programming techniques, which is demonstrated by the two programs shown in Program Listings 1 (in Part 1) and 2.

If you need line numbers on every statement and don't have a line numbering function in your BASIC or editor program, you will have to insert them when you key in the programs. There should be sufficient room between the line numbers used (see Table 1) for you to do this without too much trouble. That is, the line number increments used for this program were selected with this in mind. The only case where you may have trouble is where the file primitives are located (line numbers 6000 to 6230). In some cases it appears that there are more statement lines than the numerical range to the next line number used. For example, see line numbers 6200 and 6210. There are 14 lines of text between 6200 and 6210. However, the entire subroutine can be written on five or fewer lines using multiple statements on the same line and by eliminating the continuation statements (the backslash,\ , means continue on next line in BASIC-E).

Error Processing

In most cases, disk file read or write errors will go through the general error processing routine, located at line number 9000. This routine prints the current file number and file name along with several other program variables. Figure 13 shows an example of an error which occurred while attempting to search a non-existent file. In this case, the file name was changed to NAMES.???, but a file was not created by the user. A message CHECK DISK DIR TO SEE IF FILE EXISTS is output as a reminder that the file may not exist. Use the CP/M facilities (DIR or STAT) to inspect the disk directory to see if this was the case.

Additions and Improvements

If you're working with 24K of memory or less, most additions or enhancements will have to be made by adding separate programs. Both TAX.BAS and TAX2.BAS are somewhat pressed for space in the versions shown. However, it's fairly easy to make a copy of either program using the CP/M utilities. For example, to define new functions, make a copy of TAX2.BAS and change the name to TAX3.BAS. Use the edit function (ED TAX3.BAS) to remove the old menu and functions and replace them with your new ones. Use the line numbers in Table 1 to maintain the line number structure and don't re-use line numbers.

One of the first additions you may want is a PRINT routine that will output a year-end listing and/or a summary report of all the items in the data base along with the total cost per category. Other enhancements will come to mind as you use the programs.

While the TAX data base programs as shown do not contain all of the features and functions that I would like, they do provide a good starting point for expansion. The programs can also be very useful as baseline or starting versions for other data base/data filing programs. I hope the programming techniques and methods used will prove helpful to others. □

Program Listing 2– TAX2.BAS

```
REM ------------------------------------------------
REM -                  TAX2.BAS                    -
REM -                  (BASIC-E)                   -
REM ------------------------------------------------
REM
PROGNAME$="TAX2.BAS"
VERSION$="V0.5,19AUG78"
REM
REM ------------------------------------------------
REM THE PURPOSE OF THIS PROGRAM IS TO.....
REM     1. ENTER NEW DATA FOR AN EXISTING DATA BASE
REM     2. PRINT REPORTS OF THE DATA.
REM        (SEE TAX.BAS FOR OTHER FUNCTIONS)
REM
REM PAUL HOLLIDAY
REM WRITTEN IN BASIC-E ON CP/M DISK.

REM CP/M-RAM SIZE = 24K
REM ORIGINAL PROGRAM STARTED 09AUG78
REM BASELINE WAS: TAX.BAS V0.9,08AUG78
REM IF ONLY 24K CPM, DONT USE $E OPTION.
REM MAKE SURE AT LEAST 800+ FREE BYTES AT RUN TIME
REM
REM INTERFACING OR RELATED PROGRAMS.....
REM     TAX.BAS          ORIGINAL (FIRST) PROGRAM
REM     TAXDATA.FIL      DATA FILE (DEFAULT) USED
REM     TAXDATA.DIR      DIRECTORY (POINTERS TO DATA)
REM
REM ------------------------------------------------
REM
REM ----- STRING DATA AND DEFAULT FILE NAMES -----
DEFAULT1$="TAXDATA.DIR" :REM DIRECTORY FILE DEFAULT NAME
DEFAULT2$="TAXDATA.FIL" :REM DATA FILE DEFAULT NAME
```

```
DEFAULTNAME$=DEFAULT2$  :REM CURRENT DATA FILE DEFAULT
DUMMY$="DUMMY REC"      :REM GENERAL STRING DUMMY
FILENAME$=DEFAULT2$     :REM CURRENT FILE NAME
FILENAME1$=DEFAULT1$    :REM DIRECTORY FILE NAME
FILENAME2$=DEFAULT2$    :REM DATA FILE NAME
REM
REM ----- VARIABLES AND CONSTANTS (INITIAL VALUES) -----
CTLD=4          :REM CTRL-D CHARACTER
CTLQ=17         :REM CTRL-Q CHARACTER
CTLS=19         :REM CTRL-S CHARACTER
DFLAGX=0        :REM SET 'RECORD DELETED' FLAG=0
DUM=0           :REM NORMAL VALUE OF NUMERIC DUMMY
DUMX=DUM        :REM NUMERIC DUMMY WRITTEN/READ ON FILES
LISTDIR=1       :REM LISTS DIRECTORY NAMES DURING SRCH
MAXDESCR=35     :REM MAX CHARS ALLOWED FOR DESCRIPTION
ONCE=0          :REM FIRST TIME THRU FLAG
PRINTER=1       :REM PRINTER OPTION=1 IF AVAILABLE
RSIZE=256       :REM SIZE OF RANDOM ACCESS RECORDS
STOPFLAG=1      :REM 1=STOP AFTER LISTING EACH RECORD
TEST=0          :REM TEST FLAG FOR DEBUG PRINTOUTS
TYPE1=1         :REM TYPE 1 RECORD=HEADER
TYPE2=2         :REM TYPE 2 RECORD=DATA RECORD
TYPE3=3         :REM TYPE 3 RECORD=(UNDEFINED)
TYPEX=0         :REM RECORD TYPE READ/WRITTEN ON FILE
REM
REM ------------------------------------------------
REM -   CONSOLE OR HARDWARE DEPENDENT EQUATES    -
REM ------------------------------------------------
CLEAR=CTLD      :REM VECTOR 1 CLEAR SCREEN CODE
PAGE=CTLQ       :REM PAGE SKIP CODE FOR PRINT (CPMLINO)
SPEED=CTLS      :REM VECTOR 1 VIDEO SPEED CONTROL CODE
REM
REM ----- SIGN ON AND IDENTIFY PROGRAM -----
GOSUB 5000      :REM CLEAR SCREEN, SET SPEED
REM PRINT OF PROGRAM NAME AND VERSION DELETED BECAUSE
REM IT IS DONE IN MENU HEADER LINE BELOW.
REM
REM
100 REM ----- RESUME, ENTRY AFTER DONE OR ERROR -----
REM
FOR MENULOOP=1 TO 1 STEP 0
REM
REM ----- FLAGS AND VARIABLES RESET ON RETRY -----
ADDCNT=0        :REM 'RECORDS ADDED..' COUNTER
ADDFLAG=0       :REM ADD RECORDS FLAG WORD
BLENGTH=RSIZE   :REM BLOCK LENGTH USED TO OPEN FILES
FILENMBR=1      :REM CURRENT FILE NUMBER IN USE
LISTFLAG=0      :REM LIST FLAG WORD
MENUFLAG=0      :REM MAIN MENU FLAG =0 IF ILLEGAL
NOCLOSE=1       :REM DONT CLOSE AFTER EACH READ/WRITE
OPENED=0        :REM RESET NUMBER OF FILES OPENED CNT
RECNMBR=2       :REM INITIAL DATA RECORD NMBR TO READ
RNMBR=1         :REM RECORD NUMBER WRITTEN ON EACH BLK
RCNT=1          :REM RECORD COUNT,SAVED ON RECORD #1
REM
IF ONCE>0 THEN GOSUB 5000       :REM CLEAR SCREEN
PRINT"INCOME TAX DATA BASE PROGRAM, ";
PRINT"(";PROGNAME$;"  ";VERSION$;")"
IF ONCE=0 THEN PRINT"INITIAL FREE BYTES=";FRE
REM IF ONCE>0 THEN 300 :REM MENU BYPASS NOP'D
PRINT
REM ----- PRINT USER SELECTION MENU -----
TAB1=10
PRINT TAB(TAB1);
PRINT"CHANGE  TO CHANGE FILE NAMES FOR THIS RUN"
PRINT TAB(TAB1);
PRINT"ENTER   TO ENTER DATA FOR EXISTING CATEGORY"
PRINT TAB(TAB1);
PRINT"OPT     TO SET/CHANGE OPTIONS (SEE .DOC)"
PRINT TAB(TAB1);
PRINT"PRINT   TO PRINT REPORTS OF TAX DATA"
PRINT TAB(TAB1);
PRINT"PRINTC  TO PRINT (LIST) ALL CATEGORY NAMES"
PRINT TAB(TAB1);
PRINT"QUIT    TO QUIT OR STOP ANY FUNCTION"
PRINT TAB(TAB1);
PRINT"CTRL-C  TO EXIT PROGRAM AND RETURN TO CP/M"
ONCE=1          :REM SET 'FIRST TIME THRU' FLAG
REM
REM
300 REM ----- ACCEPT USER MENU SELECTION -----
REM INSERT PRINT"ADD,CREATE,...ETC IF MENU BYPASSED
PRINT
PRINT"TYPE SOMETHING: ";
GOSUB 9202      :REM INPUT ALPHA,CHECK FOR QUIT
IF A$="CHANGE"  THEN GOSUB 1700
IF A$="ENTER"   THEN GOSUB 1100
IF A$="OPT"     THEN GOSUB 1600
IF A$="PRINT"   THEN 1900
IF A$="PRINTC"  THEN 2000
IF A$="QUIT"    THEN 9900
IF LEFT$(A$,1)="Q" THEN 9900
PRINT
IF MENUFLAG=0 THEN \
        PRINT"ILLEGAL ENTRY....." :\
        FOR I=1 TO 200 :\
        NEXT I
NEXT MENULOOP
REM
REM
REM ------------------------------------------------
REM -              FUNCTIONS                       -
REM ------------------------------------------------
REM
REM FNR2(X) - ROUNDS A NUMBER TO 2 DECIMAL PLACES.
REM 100=10^D=10^2 (WHERE D= # OF DECIMAL PLACES)
DEF FNR2 (X) = INT(X*100+0.5)/100
REM
REM ------------------------------------------------
REM -            MAIN SUBROUTINES                  -
REM ------------------------------------------------
REM
1000 REM SEE TAX.BAS
REM
1100 REM ---------------
REM      -    ENTER    -
REM      ---------------
REM
UPDATEDIR=0     :REM RESET 'UPDATE DIRECTORY' FLAG
GOSUB 5000      :REM CLEAR SCREEN
PRINT"ENTER - USED TO ENTER DATA FOR EXISTING CATEGORY
IF TEST=1 AND NAMECHANGE=0 THEN GOSUB 7830
FILENAME2$=DEFAULTNAME$ :REM SET DATA FILE NAME
GOSUB 7850      :REM SET FILENAME1$ (.DIR)
PRINT
GOSUB 7940      :REM INPUT CATEGORY NAME
REM
REM -- READ DIRECTORY AND SEARCH FOR NAME --
PRINT"SEARCHING DIRECTORY '";FILENAME1$;"'"
FOUND=0         :REM SET FLAG=0 FOR NOT FOUND YET
FILENMBR=1      :REM SET FILENUMBER TO READ
IF END # FILENMBR THEN 1130
GOSUB 7050      :REM SETUP,OPENFILE,READ DIRECTORY HEADER
REM
PRINT
IF LISTDIR=1 THEN \
        GOSUB 8020
N=0     :REM COUNTER FOR PRINT 1., 2., ETC
REM
FOR ENTERLOOP=1 TO 1 STEP 0
N=N+1           :REM INCREMENT PRINT COUNTER
GOSUB 6130      :REM READ DIRECTORY DATA RECORD
IF LISTDIR=1 AND N<10 THEN PRINT" ";
IF LISTDIR=1 THEN PRINT N;". ";ITEMNAMEX$
IF ITEMNAME$=LEFT$(ITEMNAMEX$,LENGTH) THEN \
        FOUND=1 :\
        GOTO 1130
NEXT ENTERLOOP
REM
1130 REM END OF DIR FILE OR FOUND ITEMNAME
PRINT
IF FOUND=0 THEN \
        GOSUB 8000 :\
        GOTO 100
REM
REM -- CATEGORY FOUND, LIST ALL RECORDS --
PRINT ITEMNAMEX$
FILENMBR=2
FILENAME$=FILENAME2$
GOSUB 6050      :REM OPEN RANDOM DATA FILE
GOSUB 6210      :REM READ RANDOM FILE HEADER RECORD
REM
GOSUB 7870      :REM PRINT TITLE LINE FOR DATA RECORDS
REM
IF FIRSTRECORDX=0 THEN \
        RCNTX=RCNTX+1 :\
        FIRSTRECORD=RCNTX :\
        ITEMNAMESAVE$=ITEMNAMEX$ :\
        TOTALCOSTX=0 :\
        PRINT"FIRSTRECORDX=0" :\
        GOSUB 7920 :\
        UPDATEDIR=1 :\
        GOSUB 7140 :\
        GOSUB 7890 :\
        GOSUB 7100 :\
        GOTO 1140
REM
REM -- READ DATA RECORDS AND PRINT UNTIL LAST ONE --
RECNMBR=FIRSTRECORDX    :REM FIRST DATA REC TO READ
FOR ENTERLOOP2=1 TO 1 STEP 0
GOSUB 6230      :REM READ RANDOM DATA RECORD
GOSUB 7890      :REM PRINT DATA RECORDS
IF NEXTRECORDX <> 0 THEN \
        RECNMBR=NEXTRECORDX \
        :NEXT ENTERLOOP2
PRINT
1140 REM LOOP AND INPUT/WRITE NEW DATA RECORDS
REM
FOR ENTERLOOP3=1 TO 1 STEP 0
GOSUB 7920      :REM INPUT DATE,DESCRIPTION,COST
IF A$="DONE" THEN 1150
REM
REM REWRITE PREVIOUS DATA RECORD
REM
RCNTX=RCNTX+1   :REM INCREMNT TO NEXT AVAIL RECORD
NEXTRECORDX=RCNTX :REM NEXT REC FOR PREV BLOCK=NEXT
RECNMBR=RNMBR   :REM RECORD TO WRITE=PREVIOUS ONE
GOSUB 6220      :REM REWRITE PREVIOUS DATA RECORD
REM
GOSUB 7140      :REM WRITE NEXT DATA RECORD
REM
GOSUB 7890      :REM PRINT DATE,DESCRIPTION,COST,TOTAL
REM
GOSUB 7100      :REM REWRITE RANDOM FILE HEADER RECORD
REM
NEXT ENTERLOOP3
REM
1150 REM ENTRY FROM ENTERLOOP3 IF "DONE"
GOSUB 6095      :REM CLOSE ALL OPENED FILES
IF UPDATEDIR=0 THEN 1180
```

Program Listing 2 continued

```
REM
PRINT
PRINT"DIRECTORY UPDATE REQUIRED.."
REM
REM UPDATE DIRECTORY WITH NEW 'FIRSTRECORDX'
REM
REM -OPEN DIRECTORY AND READ HEADER-
IF END #1 THEN 9000
GOSUB 7050      :REM SETUP,OPEN,READ DIR HEADER
REM
REM -OPEN SCRATCH AND WRITE HEADER-
FILENMBR=2      :FILENAME$="SCRATCH1"
GOSUB 6000      :REM OPEN SEQUENTIAL SCRATCH FILE
GOSUB 6100      :REM WRITE SEQUENTIAL SCRATCH HEADER
REM
REM -LOOP AND READ/WRITE, ADD NEW ITEM TO SCRATCH-
IF END #1 THEN 1160
FOR ENTERLOOP4=1 TO 1 STEP 0
FILENMBR=1      :FILENAME$=FILENAME1$
GOSUB 6130      :REM READ DIRECTORY DATA RECORD
IF ITEMNAMEX$=ITEMNAMESAVE$ THEN \
       FIRSTRECORDX=FIRSTRECORD :\
       PRINT"UPDATING '";ITEMNAMEX$;"' ON SCRATCH"
FILENMBR=2      :FILENAME$="SCRATCH1"
GOSUB 6120      :REM WRITE SCRATCH DIRECTORY DATA REC
NEXT ENTERLOOP4
REM
1160 REM AT END OF OLD DIRECTORY,
REM
REM -COPY SCRATCH1 BACK TO DIRECTORY-
PRINT"NOW UPDATING DIRECTORY.."
GOSUB 6095      :REM CLOSE AND REWIND ALL FILES
FILENAME$=FILENAME1$
GOSUB 6000      :REM RE-OPEN DIRECTORY FILE
FILENAME$="SCRATCH1"
GOSUB 6000      :REM R-OPEN SCRATCH FILE
FILENMBR=2      :FILENAME$="SCRATCH1"
GOSUB 6110      :REM READ SCRATCH HEADER
FILENMBR=1      :FILENAME$=FILENAME1$
GOSUB 6100      :REM RE-WRITE DIRECTORY HEADER
REM
REM -LOOP AND COPY REST OF SCRATCH1 TO DIRECTORY-
IF END #2 THEN 1170
FOR COPYLOOP=1 TO 1 STEP 0
FILENMBR=2      :FILENAME$="SCRATCH1"
GOSUB 6130      :REM READ DIRECTORY RECORDS ON SCRATCH
FILENMBR=1      :FILENAME$=FILENAME1$
GOSUB 6120      :REM WRITE NEW DIRECTORY RECORDS
NEXT COPYLOOP
REM
1170 REM END OF COPYLOOP,SCRATCH COPIED TO DIR.
GOSUB 6095      :REM CLOSE ALL OPENED FILES
PRINT"DIRECTORY UPDATED.."
REM
PRINT
1180 REM ENTRY FROM ABOVE IF NO DIR UPDATE
PRINT
PRINT"DONE WITH DATA ENTRY, ";
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
MENUFLAG=1
GOTO 100
REM
1200 REM SEE TAX.BAS
1300 REM SEE TAX.BAS
1400 REM SEE TAX.BAS
REM
1600 REM ---------------
REM      -     OPT     -
REM      ---------------
GOSUB 5000      :REM CLEAR SCREEN
PRINT"OPTIONS SELECTION..,"
MENUFLAG=1
GOSUB 8050      :REM PRINT CURRENT OPTION FLAGS
PRINT
PRINT"TEST FLAG (0 OR 1) ";
INPUT TEST
PRINT"PRINTER (0 OR 1) ";
INPUT PRINTER
PRINT"LIST DIRECTORY (0 OR 1) ";
INPUT LISTDIR
GOSUB 8050      :REM PRINT CURRENT OPTION FLAGS
PRINT
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
RETURN
REM
1700 REM ---------------
REM      -    CHANGE   -
REM      ---------------
REM DISPLAYS FILE NAMES AND ALLOWS CHANGING THEM
GOSUB 5000      :REM CLEAR SCREEN
PRINT"CHANGE - ALLOWS CHANGING FILE NAMES"
MENUFLAG=1
DEFAULTNAME$=FILENAME2$
GOSUB 7830      :REM PRINT CURRENT NAMES,INPUT NEW
FILENAME2$=FILENAME$    :REM SET NEW DATA FILE NAME
GOSUB 7850      :REM SET FILENAME1$ (ADD .DIR)
PRINT
GOSUB 7860      :REM PRINT CURRENT FILE NAMES
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
RETURN
REM
REM
1900 REM ---------------
REM      -    PRINT    -
REM      ---------------
MENUFLAG=1
GOSUB 5000      :REM CLEAR SCREEN
PRINT"PRINT - PRINTS REPORTS OF TAX DATA FILES"
PRINT
PRINT"USE 'OPT' TO TURN PRINTER ON OR OFF,"
PRINT
GOSUB 7940      :REM INPUT CATEGORY NAME TO PRINT
REM
REM -- READ DIRECTORY AND SEARCH FOR NAME --
PRINT"SEARCHING DIRECTORY FOR: '";ITEMNAME$;"'"
FOUND=0         :REM SET FLAG TO 'NOT FOUND'
FILENMBR=1      :REM SET FILE TO READ
IF END #1 THEN 9000
GOSUB 7050      :REM SETUP,OPEN FILE,READ DIR HEADER
REM
IF END #1 THEN 1930
FOR PRINTLOOP=1 TO 1 STEP 0
GOSUB 6130      :REM READ DIRECTORY RECORD
IF ITEMNAME$ <> LEFT$(ITEMNAMEX$,LENGTH) THEN \
       NEXT PRINTLOOP
FOUND=1
REM
1930 REM END OF DIRECTORY OR FOUND ITEM NAME
PRINT
IF FOUND=0 THEN \
       GOSUB 8000 :\
       GOTO 100
REM
GOSUB 5000      :REM CLEAR SCREEN
IF PRINTER=1 THEN \
       PRINT"MAKE PRINTER READY, "; :\
       GOSUB 9220 :\
       PRINT CHR$(PAGE)
IF PRINTER=0 THEN PRINT
REM
GOSUB 8010      :REM PRINT 'DATA BASE TITLE...'
PRINT
REM -- CATEGORY FOUND, LIST ALL DATA RECORDS --
PRINT ITEMNAMEX$
FILENMBR=2      :FILENAME$=FILENAME2$
GOSUB 6050      :REM OPEN RANDOM DATA FILE
GOSUB 6210      :REM READ RANDOM FILE HEADER RECORD
GOSUB 7870      :REM PRINT TITLE LINE FOR DATA RECORDS
REM
IF FIRSTRECORDX=0 THEN \
       PRINT"NO DATA ENTERED FOR THIS CATEGORY" :\
       GOTO 1980
REM
REM -- READ DATA RECORDS AND PRINT UNTIL LAST ONE --
RECNMBR=FIRSTRECORDX    :REM SET FIRST DATA REC TO FIND
FOR PRINTLOOP=1 TO 1 STEP 0
GOSUB 6230      :REM READ RANDOM DATA RECORD
GOSUB 7890      :REM PRINT DATA FROM RECORD
IF NEXTRECORDX <> 0 THEN \
       RECNMBR=NEXTRECORDX :\
       NEXT PRINTLOOP
PRINT
REM
1980 REM
IF PRINTER=1 THEN PRINT CHR$(PAGE) ELSE PRINT
GOSUB 6095      :REM CLOSE ANY OPENED FILES
PRINT"FINISHED WITH 'PRINT'.."
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
GOTO 100
REM
2000 REM ---------------
REM      -    PRINTC   -
REM      ---------------
REM
LINECNT=0
MENUFLAG=1
GOSUB 5000      :REM CLEAR SCREEN
PRINT"PRINTC - PRINTS OR LISTS ALL CATEGORIES IN DIRECTORY"
PRINT
PRINT"USE 'OPT' TO TURN PRINTER ON OR OFF,"
PRINT"USE 'CTRL-S' TO STOP LISTING"
PRINT
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
REM
REM -- OPEN FILE AND READ DIRECTORY HEADER --
IF END #1 THEN 9000
GOSUB 7050      :REM SETUP,OPEN FILE,READ DIRECTORY HEADER
REM
REM -- PRINT IDENTIFIERS AND HEADERS --
GOSUB 5000      :REM CLEAR SCREEN
IF PRINTER=1 THEN \
       PRINT"MAKE PRINTER READY, "; :\
       GOSUB 9220 :\
       PRINT CHR$(PAGE) :\
       LINECNT=LINECNT
GOSUB 8010      :REM PRINT 'DATA BASE TITLE..'
GOSUB 8020      :REM PRINT 'EXISTING CATEGORIES ARE..'
PRINT
LINECNT=LINECNT+3
REM
REM -- SETUP, LOOP AND PRINT DIRECTORY UNTIL DONE --
N=0             :REM SET INITIAL VALUE OF CATEG. COUNT
IF END #1 THEN 2030
```

```
FOR PRINTCLOOP=1 TO 1 STEP 0
N=N+1           :REM INCREMENT NUMBER OF CATEGORY
GOSUB 6130      :REM READ DIRECTORY DATA RECORD
IF N<10 THEN PRINT" ";
PRINT N;". ";ITEMNAMEX$
LINECNT=LINECNT+1
IF LINECNT >= 14 THEN \
        PRINT TAB(6); :\
        GOSUB 9220 :\
        LINECNT=0 :\
        PRINT
NEXT PRINTCLOOP
REM
2030 REM ENTRY FROM ABOVE AT END OF DIRECTORY RECORDS
GOSUB 6095      :REM CLOSE ANY OPENED FILES
PRINT
PRINT"FINISHED WITH 'PRINTC', ";
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
GOTO 100
REM
5000 REM ----- CLEAR SCREEN AND RESET TO TOP -----
PRINT CHR$(CLEAR) :REM VECTOR MONITOR CLEAR SCREEN=CTRL-D
REM SPEED UP VECTOR VIDEO DISPLAY...
FOR I = 1 TO 7 :PRINT CHR$(SPEED); :NEXT I
PRINT           :REM ONLY FOR VECTOR/CPMLINO,CRLF
RETURN
REM
REM ----- BOILER PLATE PRINT LINES USED OFTEN -----
5010 PRINT"ENTER 999 OR Q TO QUIT OR STOP" :RETURN
5020 PRINT"ENTER ZERO (0) OR SPACE FOR NO CHANGE" :RETURN
5030 PRINT"CTRL-C TO EXIT THIS PROGRAM" :RETURN
REM
REM
REM ---------------------------------------------
REM -     FILE PRIMITIVES, OPEN/CLOSE FILES     -
REM ---------------------------------------------
REM
6000 REM ----- OPEN SEQUENTIAL FILE -----
OPENED=OPENED+1
FILE FILENAME$
RETURN
REM
6050 REM ----- OPEN RANDOM FILE -----
IF END # FILENMBR THEN 9000
OPENED=OPENED+1
FILE FILENAME$(BLENGTH)
RETURN
REM
6095 REM ----- CLOSE ALL OPENED FILES -----
IF OPENED <= 0 THEN RETURN
FOR I=1 TO OPENED :CLOSE (I) :NEXT I :OPENED=0
RETURN
REM
REM ---------------------------------------------
REM -     FILE PRIMITIVES, SEQUENTIAL FILES     -
REM ---------------------------------------------
REM LAST CHANGED: TAX.BAS V1.5,14AUG78  RNMBRX NOW DUMX
REM CHANGED TAX2.BAS ON 15AUG78 TO COMPLY.
REM
6100 REM ----- WRITE SEQUENTIAL HEADER RECORD (DIRECTORY) ---
WRITFLAG=1
REM DO 'IF END # ...' BEFORE ENTRY
IF TEST=1 THEN PRINT"* WRITING DIRECTORY HEADER RECORD.."
PRINT # FILENMBR;\
        DUMX,FILENAMEX$,DATE1X$,TITLE1X$,\
        DUM,DUM,DUM,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
WRITFLAG=0
RETURN
REM
6110 REM ----- READ SEQUENTIAL HEADER RECORD (DIRECTORY) ---
REM DO 'IF END...' BEFORE ENTRY
READFLAG=1
IF TEST=1 THEN PRINT": READING DIRECTORY HEADER RECORD.."
READ # FILENMBR;\
        DUMX,FILENAMEX$,DATE1X$,TITLE1X$,\
        DUM,DUM,DUM,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
READFLAG=0
RETURN
REM
6120 REM ----- WRITE SEQUENTIAL (DIRECTORY) RECORD -----
REM DO 'IF END #...' BEFORE ENTRY
WRITFLAG=1
IF TEST=1 THEN PRINT"* WRITING DIRECTORY RECORD.."
PRINT # FILENMBR;\
        DUMX,DUM,DUM,DUM,\
        DATE2X$,ITEMNAMEX$,FIRSTRECORDX,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
WRITFLAG=0
RETURN
REM
6130 REM ----- READ SEQUENTIAL DIRECTORY RECORD -----
REM DO 'IF END..' BEFORE ENTRY
READFLAG=1
IF TEST=1 THEN PRINT": READING DIRECTORY DATA RECORD.."
READ # FILENMBR;\
        DUMX,DUM,DUM,DUM,\
        DATE2X$,ITEMNAMEX$,FIRSTRECORDX,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
READFLAG=0
RETURN
REM
REM ---------------------------------------------
REM -   FILE PRIMITIVES, RANDOM ACCESS FILES    -
REM ---------------------------------------------
REM 18AUG78,TAX V1.6, CHANGED DUM TO DFLAGX AT 6220,6230
REM
6200 REM ----- WRITE RANDOM FILE HEADER RECORD -----
WRITFLAG=1
IF END # FILENMBR THEN 9000
IF TEST=1 THEN PRINT"* WRITING RANDOM FILE HEADER RECORD.."
PRINT # FILENMBR,1;\
        RNMBR,RSIZE,TYPE1,RCNTX,DUM,DUM,\
        FILENAMEX$,DATE1X$,VERSIONX$,\
        DUM,DUMMY$,\
        TITLE1X$,\
        DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
WRITFLAG=0
RETURN
REM
6210 REM ----- READ RANDOM FILE HEADER RECORD -----
READFLAG=1
IF END # FILENMBR THEN 9000
READ # FILENMBR,1;\
        RNMBR,RSIZE,TYPE1,RCNTX,DUM,DUM,\
        FILENAMEX$,DATE1X$,VERSIONX$,\
        DUM,DUMMY$,\
        TITLE1X$,\
        DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
READFLAG=0
RETURN
REM
6220 REM ----- WRITE RANDOM FILE DATA RECORD -----
WRITFLAG=1
IF END # FILENMBR THEN 9000
IF TEST=1 THEN PRINT"* WRITING DATA RECORD (RECNMBR)=";RECNMBR
PRINT # FILENMBR,RECNMBR;\
        RNMBR,RSIZE,TYPEX,DFLAGX,DUM,DUM,\
        ITEMNAMEX$,\
        NEXTRECORDX,\
        DATEX$,DESCRIPTIONX$,\
        COSTX,TOTALCOSTX,\
        DUM,DUM,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
WRITFLAG=0
RETURN
REM
6230 REM ----- READ RANDOM FILE DATA RECORD -----
READFLAG=1
IF END # FILENMBR THEN 9000
READ # FILENMBR,RECNMBR;\
        RNMBR,RSIZE,TYPEX,DFLAGX,DUM,DUM,\
        ITEMNAMEX$,\
        NEXTRECORDX,\
        DATEX$,DESCRIPTIONX$,\
        COSTX,TOTALCOSTX,\
        DUM,DUM,\
        DUMMY$,DUMMY$,\
        DUMMY$
IF NOCLOSE=0 THEN CLOSE (FILENMBR)
READFLAG=0
RETURN
REM
REM .......... END OF 'FILE PRIMITIVES' ..........
REM
REM
7050 REM -- SETUP,OPEN FILE, READ DIRECTORY HEADER --
NOCLOSE=1
FILENMBR=1
FILENAME$=FILENAME1$
GOSUB 6000      :REM OPEN SEQUENTIAL DIRECTORY FILE
GOSUB 6110      :REM READ DIRECTORY HEADER
RETURN
REM
7100 REM ----- REWRITE RANDOM FILE HEADER RECORD -----
TEMP1=RNMBR     :REM SAVE DATA RECORD NUMBER
RNMBR=1         :REM SET RECORD #=1 FOR HEADER
GOSUB 6200      :REM REWRITE RANDOM HEADER RECORD
RNMBR=TEMP1     :REM RESET LAST/CURRENT RECORD NUMBER
RETURN
REM
7140 REM ----- WRITE NEXT DATA RECORD -----
RECNMBR=RCNTX   :REM SET RECORD # TO WRITE
RNMBR=RCNTX     :REM REC NMBR ON BLOCK=NEXT AVAIL
NEXTRECORDX=0   :REM ENSURE NEXT REC POINTER=0
COSTX=COST      :REM SET COST WRITTEN ON RECORD
DATEX$=DATE$    :REM SET DATE WRITTEN
DESCRIPTIONX$=DESCRIPTION$
```

Program Listing 2 continued

```
TOTALCOSTX=TOTALCOSTX+COST :REM TOTAL=PREV+CURRENT COST
GOSUB 6220      :REM WRITE NEXT DATA RECORD
RETURN
REM
7830 REM ----- REQUEST NEW FILE NAME (INPUT) -----
PRINT
PRINT"DEFAULT FILE NAME IS NOW: ";DEFAULTNAME$
PRINT"NEW FILE NAME (OR SPACE FOR NO CHANGE) ";
GOSUB 9202      :REM INPUT ALPHA,CHECK FOR QUIT
IF LEN(A$)<=1 THEN A$=DEFAULTNAME$
A$=LEFT$(A$,12) :REM SET MAX NAME LENGTH
FILENAME$=A$    :REM SET CURRENT FILE NAME
PRINT
PRINT"FILE NAME IS: ";FILENAME$
PRINT"IS THIS CORRECT (Y OR N)";
GOSUB 9202      :REM INPUT ALPHA, CHECK FOR QUIT
IF LEFT$(A$,1) <> "Y" THEN 7830
DEFAULTNAME$=FILENAME$  :REM RESET NEW DEFAULT NAME
NAMECHANGE=1            :REM 'NAME WAS CHANGED' FLAG
RETURN
REM
7850 REM ----- SET FILENAME1$ AND ADD '.DIR' -----
REM ENTER WITH 'FILENAME2$' SET TO NAME OF DATA FILE
REM RETURNS WITH 'FILENAME1$' SAME BUT WITH '.DIR'
LENGTH=8        :REM SET MAX LENGTH BEFORE "."
FOR J=1 TO 8
IF MID$(FILENAME2$,J,1)="." THEN LENGTH=J-1
NEXT J
FILENAME1$=LEFT$(FILENAME2$,LENGTH)+".DIR"
IF FILENAME1$=FILENAME2$ THEN PRINT"ERROR 7850.." \
        :PRINT"DATA FILE SAME NAME AS DIRECTORY" \
        :GOSUB 9220 \
        :GOTO 100
RETURN
REM
7860 REM ----- PRINT CURRENT FILE NAMES -----
PRINT"DATA FILE NAME IS..... ";FILENAME2$
PRINT"DIRECTORY FILE NAME IS.. ";FILENAME1$
RETURN
REM
7870 REM ----- PRINT TITLE LINE FOR DATA RECORDS -----
PRINT
T2=10 :T3=46 :T4=56     :REM SET TABS FOR PRINT
PRINT"DATE";
PRINT TAB(T2);"DESCRIPTION";
PRINT TAB(T3);"AMOUNT";
PRINT TAB(T4);"TOTAL"
PRINT"--------";
PRINT TAB(T2);"----------------------";
PRINT TAB(T3);"------";
PRINT TAB(T4);"-----"
RETURN
REM
7890 REM ----- PRINT DATA RECORDS -----
PRINT DATEX$;
PRINT TAB(T2);DESCRIPTIONX$;
PRINT TAB(T3);"$";COSTX;
PRINT TAB(T4);"$";TOTALCOSTX
RETURN
REM
7920 REM ----- INPUT DATE,DESCRIPTION,COST -----
T=15            :REM INPUT DATA POSITION
PRINT"DATE .........";
GOSUB 9202      :REM INPUT ALPHA,CHECK FOR QUIT
IF A$="DONE" THEN RETURN
DATE$=A$        :REM SET DATE OF ENTRY/START
PRINT"DESCRIPTION ...";
GOSUB 9202      :REM INPUT ALPHA,CHECK FOR QUIT
IF A$="DONE" THEN RETURN
DESCRIPTION$=LEFT$(A$,MAXDESCR) :REM SET AND TRUNCATE
PRINT"AMOUNT (COST)..";
GOSUB 9201      :REM INPUT NUMERIC,CHECK FOR QUIT
COST=A          :REM SET COST OF ITEM
RETURN
REM
7940 REM ----- INPUT CATEGORY (OR NAME) -----
PRINT"WHAT IS CATEGORY OR NAME DESIRED ";
GOSUB 9202      :REM INPUT ALPHA,CHECK FOR QUIT
GOSUB 7960      :REM SET LENGTH IF '*' AT END
ITEMNAME$=A$    :REM SET ITEM NAME TO FIND
RETURN
REM
7960 REM ----- SET LENGTH OF STRING IF '*' FOUND -----
LENGTH=LEN(A$)
FOR J=1 TO LENGTH
IF MID$(A$,J,1)="*" THEN LENGTH=J-1
NEXT J
A$=LEFT$(A$,LENGTH)
RETURN
REM
8000 REM ----- PRINT 'ITEM NAME NOT FOUND..' -----
PRINT
PRINT"'";ITEMNAME$;"' NOT FOUND.."
PRINT"USE 'ADD' TO START NEW CATEGORY"
PRINT
GOSUB 6095      :REM CLOSE ANY OPENED FILES
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
RETURN
REM
8010 REM -- PRINT 'DATA BASE TITLE = ...' --
PRINT"DATA BASE TITLE = ";TITLE1X$
RETURN
REM
8020 REM -- PRINT 'EXISTING CATEGORIES ARE...' --
PRINT"EXISTING CATEGORY NAMES FOR '";FILENAME1$;"' ARE..."
RETURN
REM
8050 REM ----- PRINT CURRENT OPTIONS FLAGS -----
PRINT
PRINT"TEST=";TEST
PRINT"PRINTER=";PRINTER
PRINT"LISTDIR=";LISTDIR
RETURN
REM
REM
8100 REM
REM
REM ------------------------------------------
REM -          ERROR PROCESSING              -
REM ------------------------------------------
REM
9000 REM ----- GENERAL FILE HANDLING ERROR -----
PRINT
IF WRITFLAG=1 THEN PRINT"WRITE ";
IF READFLAG=1 THEN PRINT"READ ";
IF READFLAG+WRITFLAG=0 THEN PRINT"OPEN ";
PRINT"FILE ERROR..."
PRINT"FILE NUMBER (FILENMBR)=";FILENMBR
PRINT"CURRENT FILE (FILENAME$) IS: ";FILENAME$
PRINT"RECNMBR=";RECNMBR
PRINT"RNMBR=";RNMBR
PRINT"RCNTX=";RCNTX
IF READFLAG=1 THEN PRINT"CHECK DISK DIR TO SEE IF FILE EXISTS"
PRINT
GOSUB 6095      :REM CLOSE ALL OPENED FILES
GOSUB 9220      :REM ENTER ANYTHING TO CONTINUE
GOSUB 5000      :REM CLEAR SCREEN
GOTO 100        :REM RESUME AT MENU
REM
REM
9200 REM ----- CHECK FOR QUIT PROGRAM ENTRY  -----
IF A=999        THEN 9900
IF A$="Q"       THEN 9900
IF A$="STOP"    THEN 9900
RETURN
REM
9201 REM ----- INPUT NUMERIC AND CHECK FOR QUIT -----
INPUT A         :GOTO 9200
REM
9202 REM ----- INPUT ALPHA AND CHECK FOR QUIT -----
INPUT A$        :GOTO 9200
REM
9220 REM ----- WAIT FOR ENTRY TO CONTINUE -----
INPUT"ENTER ANYTHING TO CONTINUE: ";A$
GOSUB 9200 :REM CHECK FOR QUIT
RETURN
REM
9900 REM ----- 'QUIT' PROGRAM ENTERED BY OPERATOR -----
PRINT
GOSUB 6095      :REM CLOSE ANY OPENED FILES
A=0             :REM RESET IF '999' WAS ENTERED
INPUT"QUIT OR RESTART (Q OR R) ";A$
IF LEFT$(A$,1)="R" THEN 100
REM
9990 REM ----- FINAL EXIT -----
PRINT
IF ADDFLAG=1 OR NEWFLAG=1 THEN PRINT ADDCNT;\
   " RECORDS ADDED TO FILE."
REM
9991 REM ----- FINAL EXIT (PRIMITIVE) -----
PRINT"FREE BYTES AT END=";FRE
PRINT PROGNAME$;" ";
PRINT"VERSION ";VERSION$;
PRINT" FINISHED."
PRINT
END

A>^Q
```

Sample Run

```
*
*******
INCOME TAX DATA BASE PROGRAM, (TAX.BAS  V1.7,19AUG78)
INITIAL FREE BYTES=1113

         ADD      TO ADD NEW CATEGORY TO DATA BASE
         CHANGE   TO CHANGE FILENAMES FOR THIS RUN
         CREATE   TO CREATE OR START NEW FILES
         DELETE   TO DELETE CATEGORY (OR NAME) FROM FILE
         HELP     TO GET MORE INSTRUCTIONS
         LIST     TO LIST A FILE
         OPT      TO SET/CHANGE OPTIONS (SEE .DOC)
         QUIT     TO QUIT OR STOP ANY FUNCTION
         CTRL-C   TO EXIT PROGRAM AND RETURN TO CP/M

TYPE SOMETHING:? LIST

*
*******
LIST - LISTS FILES.

LIST OF 'TAXDATA.DIR' AND 'TAXDATA.FIL'

ENTER ANYTHING TO CONTINUE:?


***** LIST DIRECTORY RECORDS *****

#1
-> DIRECTORY HEADER RECORD.....
DIRECTORY FILE NAME=TAXDATA.DIR
FILE CREATION DATE=17AUG78
DATA BASE TITLE=INCOME TAX DATA 1978

#2
-> DIRECTORY DATA RECORD...
CATEGORY CREATION DATE=17AUG78
FILING CATEGORY (ITEM NAME)=AUTO INSURANCE
FIRST DATA RECORD LOCATION= 2

ENTER ANYTHING TO CONTINUE:?

#3
-> DIRECTORY DATA RECORD...
CATEGORY CREATION DATE=17AUG78
FILING CATEGORY (ITEM NAME)=AUTO LICENSE FEES
FIRST DATA RECORD LOCATION= 3
```

```
#30
-> DIRECTORY DATA RECORD...
CATEGORY CREATION DATE=17AUG78
FILING CATEGORY (ITEM NAME)=TOOLS
FIRST DATA RECORD LOCATION= 0

ENTER ANYTHING TO CONTINUE:?

#31
-> DIRECTORY DATA RECORD...
CATEGORY CREATION DATE=18AUG78
FILING CATEGORY (ITEM NAME)=VISITATION
FIRST DATA RECORD LOCATION= 21

ENTER ANYTHING TO CONTINUE:?


END OF DIRECTORY LISTING.....
ENTER ANYTHING TO CONTINUE:?


** LISTING OF DATA FILE: TAXDATA.FIL **
LAST RANDOM FILE RECORD IS: 40
FIRST RECORD # TO LIST=? 1

LAST RECORD TO LIST=? 40

DO YOU WANT TO STOP AFTER EACH RECORD (Y OR N)? N


MAKE PRINTER READY..., ENTER ANYTHING TO CONTINUE:?

*
*******
```

```
>
LISTING OF: TAXDATA.FIL FILE..
FROM RECORD #1 TO RECORD #40

--> RANDOM FILE HEADER RECORD...
CURRENT RECORD NUMBER:  1
RECORD SIZE =           256
RECORD TYPE =           1
TOTAL RECORDS =         40
DATA FILE NAME =        TAXDATA.FIL
FILE CREATION DATE =    17AUG78
PROGRAM VERSION WAS:    V1.5,14AUG78
TITLE OF DATA BASE =    INCOME TAX DATA 1978

RECORD NUMBER =         2
RECORD SIZE =           256
RECORD TYPE =           2
CATEGORY (ITEM) NAME =  AUTO INSURANCE
NEXT DATA RECORD IS:    0
DATE OF ENTRY =         17AUG78
DESCRIPTION =           SEE: INSURANCE AUTO AND MOTORCYCLE
COST OF ITEM =          $0
CUMULATIVE COST =       $0

RECORD NUMBER =         3
RECORD SIZE =           256
RECORD TYPE =           2
CATEGORY (ITEM) NAME =  AUTO LICENSE FEES
NEXT DATA RECORD IS:    0
DATE OF ENTRY =         15JUL78
DESCRIPTION =           1975 HONDA MOTORCYCLE
COST OF ITEM =          $20
CUMULATIVE COST =       $20

RECORD NUMBER =         4
RECORD SIZE =           256
RECORD TYPE =           0
CATEGORY (ITEM) NAME =  BOOKS AND EDUCATIONAL
NEXT DATA RECORD IS:    5
DATE OF ENTRY =         25JAN78
DESCRIPTION =           ENCYCLOPEDIA OF COMPUTER SCIENCE
COST OF ITEM =          $0
CUMULATIVE COST =       $0

RECORD NUMBER =         5
RECORD SIZE =           256
RECORD TYPE =           0
CATEGORY (ITEM) NAME =  BOOKS AND EDUCATIONAL
NEXT DATA RECORD IS:    6
DATE OF ENTRY =         25JAN78
DESCRIPTION =           MICROCOMPUTER HANDBOOK (SIPPL)
COST OF ITEM =          $17.38
CUMULATIVE COST =       $17.38
```

```
RECORD NUMBER =         39
RECORD SIZE =           256
RECORD TYPE =           0
CATEGORY (ITEM) NAME =  MISC
NEXT DATA RECORD IS:    0
DATE OF ENTRY =         24MAR78
DESCRIPTION =           MILEAGE TO OTP 20MI/WK=800 MI
COST OF ITEM =          $120
CUMULATIVE COST =       $120

RECORD NUMBER =         40
RECORD SIZE =           256
RECORD TYPE =           0
CATEGORY (ITEM) NAME =  PROFESSIONAL ASSOCIATION DUES
NEXT DATA RECORD IS:    0
DATE OF ENTRY =         20AUG78
DESCRIPTION =           NO ENTRIES AS OF THIS DATE
COST OF ITEM =          $0
CUMULATIVE COST =       $0


END OF LIST FOR FILE NAMED: TAXDATA.FIL
ENTER ANYTHING TO CONTINUE:?

*
*******
INCOME TAX DATA BASE PROGRAM, (TAX.BAS  V1.7,19AUG78)

         ADD      TO ADD NEW CATEGORY TO DATA BASE
         CHANGE   TO CHANGE FILENAMES FOR THIS RUN
         CREATE   TO CREATE OR START NEW FILES
         DELETE   TO DELETE CATEGORY (OR NAME) FROM FILE
         HELP     TO GET MORE INSTRUCTIONS
         LIST     TO LIST A FILE
         OPT      TO SET/CHANGE OPTIONS (SEE .DOC)
         QUIT     TO QUIT OR STOP ANY FUNCTION
         CTRL-C   TO EXIT PROGRAM AND RETURN TO CP/M

TYPE SOMETHING:? Q

QUIT OR RESTART (Q OR R)? Q
```

Tracking Prices at the Store

BY SAM NEWHOUSE

Would you like to save time and money while grocery shopping? Using your personal computer, this program and your supermarket sales slips, you'll be able to track the average prices of items you buy most often.

With this information, you can identify the true bargains, as well as avoid buying over-priced goods. You might want to stock up on a product you use a lot when the price is low. Also, you can substitute something else for an over-priced item.

Here's how it works: For a month, save all your grocery receipts. If the receipts are not itemized by item name, write down the name of each item next to its price as you remove it from your shopping bag.

Next, type this program, line by line, into your BASIC-speaking computer. The language used is Altair BASIC Version 3.4. This BASIC allows multiple statements per line, string variables and matrices. The only unusual statements are in Lines 20 and 49.

Line 20 reads: "Clear 2000: Null 10". This means to clear 2000 characters of memory for string space (an arbitrary number). The rest of the line, "Null 10", instructs the computer to delay 10 character-times by sending 10 null non-printing characters after each carriage return, to accomodate slow mechanical printers.

Line 58 reads: "Width 49". The output line will be a maximum of 49 characters wide. Its use is strictly optional, but makes the printout more attractive.

After the program is typed in, debugged and saved on some permanent storage medium, run the program.

"Market" will first request the current date. This date will eventually appear on the average price printout, and will give you a reference to its validity.

Next, you will be asked how many grocery items you want to get average prices for. Then, the names of these items are typed in.

Finally, each item's name is printed, followed by a request for a price. "Market" will continue requesting prices for an item until you signify there are no more prices for that item by hitting "return".

After prices for all items are input, "Market" prints out a neat little chart showing the average price of each item. Take this chart to the store with you. Compare the prices on it with the prices marked on the goods in the store. Price fluctuation will be much more obvious. To get this information from your newspaper grocery ads would necessitate saving months of newspapers.

Once you've obtained your average prices, it's not necessary to keep entering prices from sales slips to keep your averages current. Instead, using "Market", you can apply the periodically published change in the cost of living.

To do this, proceed as before, entering the name of each item from your old printout. Then, choose the "Old Data" command. "Market" will request the average price for each item, which you should enter from the old printout.

Finally, enter the cost of living adjustment; for example, 1.5%, (typed in as "1.5"). "Market" will apply this adjustment to each of the old averages in turn, producing a new, updated set of prices for you.

Sample Run Notes

In the sample run, I first input the date, 11/22/78.

Next, the number of grocery items, 7, was input followed by the names of each item.

The "New Data" command instructs the program to input prices for each of the menu items. Notice that each item may have a differing number of prices entered for it.

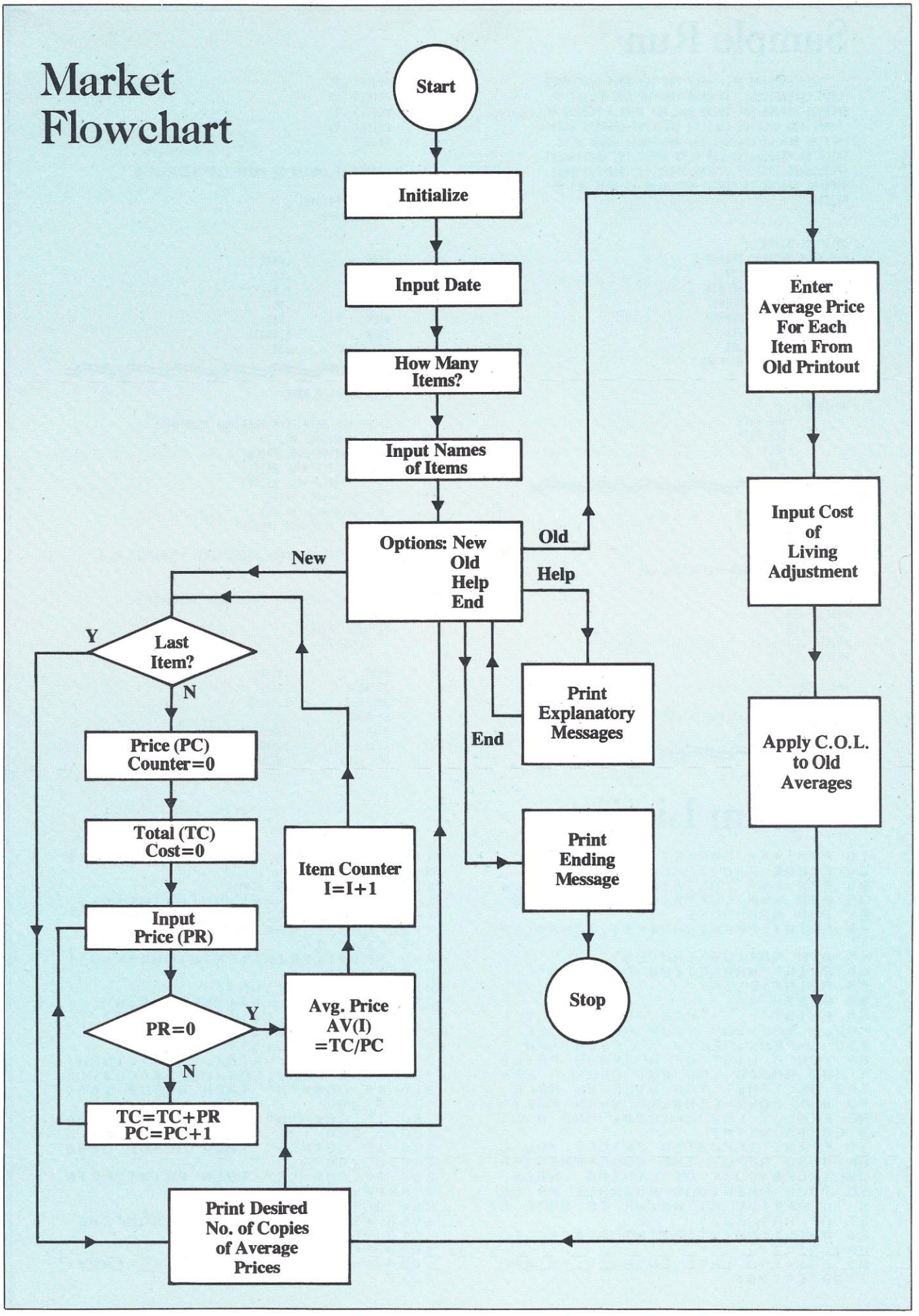
Next, I requested two copies of the price list to be printed.

A new options menu is then displayed. This time, I selected the "Old Data" command, which is used to apply a cost of living adjustment to a previous average.

In this case, I did not re-enter the averages because they were still assigned in the computer's memory to the appropriate variables. Instead, when asked the old average price, I simply pressed the "return" key each time. This left the old value of each variable undisturbed. (This may not work in your BASIC. Try it.)

The result of applying a 2% increase to the previous prices is shown in the new average price printout. Check it! Each price is 2% more than its corresponding price in the first price list. □

Market Flowchart



Sample Run

```
   THIS PROGRAM WILL HELP YOU BUY YOUR GROCERIES
 LESS EXPENSIVELY. BY CREATING FOR YOU A LIST OF
AVERAGE PRICES FOR GOODS YOU BUY OVER A PERIOD OF
 TIME, YOU WILL BE ABLE TO BUY LOSS-LEADERS WHEN
THEY'RE REALLY LOW-PRICED, AND AVOID GOODS WITH
INFLATED PRICES.YOU CAN ALSO APPLY THE GOVERNMENT
-PUBLISHED COST OF LIVING INDEX TO YOUR PREVIOUS
AVERAGE PRICES TO ARRIVE AT AN UP TO DATE SET OF
PRICES.


DATE? 11/22/78
HOW MANY GROCERY ITEMS? 7
 1 . ITEM NAME? PEAS
 2 . ITEM NAME? CARROTS
 3 . ITEM NAME? RAVIOLI
 4 . ITEM NAME? SPINACH
 5 . ITEM NAME? MILK
 6 . ITEM NAME? EGGS
 7 . ITEM NAME? CAT FOOD


OPTIONS:
         NEW DATA
         OLD DATA
         HELP
         END
```

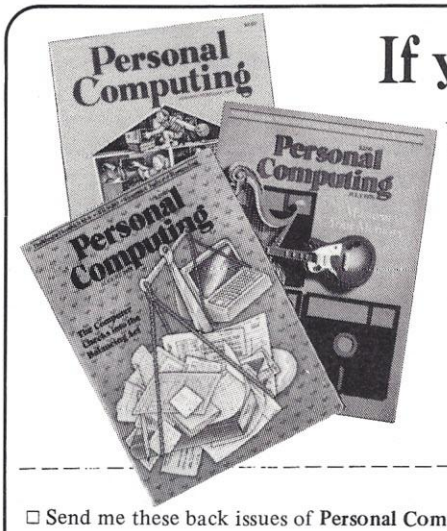
```
COMMAND? NEW DATA

PRICE OF:
     PEAS
ENTER 'RETURN' WHEN ALL PRICES ARE
INPUT FOR PEAS.
PRICE? .39
PRICE? .39
PRICE? .43
PRICE? .42
PRICE?

PRICE OF:
     CARROTS
ENTER 'RETURN' WHEN ALL PRICES ARE
INPUT FOR CARROTS.
PRICE? .37
PRICE? .39
PRICE? .37
PRICE? .39
PRICE?

NUMBER OF COPIES OF PRICE LIST DESIRED? 2

AVERAGE PRICES:
   11/22/78


PEAS            .4075
CARROTS         .31
RAVIOLI         1.334
SPINACH         .55
MILK            .906
EGGS            1.08333
CAT FOOD        .38
```

```
COMMAND? OLD DATA

ENTER OLD DATA FROM PREVIOUS PRINTOUT:
 1 . PEAS-AVG. PRICE?
 2 . CARROTS-AVG. PRICE?
 3 . RAVIOLI-AVG. PRICE?
 4 . SPINACH-AVG. PRICE?
 5 . MILK-AVG. PRICE?
 6 . EGGS-AVG. PRICE?
 7 . CAT FOOD-AVG. PRICE?

ENTER COST OF LIVING ADJUSTMENT, EXPRESSED AS A
PERCENT? 2.0

NUMBER OF COPIES OF PRICE LIST DESIRED? 1

AVERAGE PRICES:
   11/22/78

PEAS            .41565
CARROTS         .3162
RAVIOLI         1.36068
SPINACH         .561
MILK            .92412
EGGS            1.105
CAT FOOD        .3876
```

Program Listing

```
10 REM *** MARKET PROGRAM
20 CLEAR 2000:NULL 10
30 REM ***  ALTAIR BASIC V 3.4
35 REM *** COPYRIGHT (C) 1978
BY SAM NEWHOUSE
40 PRINT:PRINTCHR$(16);CHR$(22
);
45 DIM NA$(50),AV(50)
50 PRINT"MARKETING PROGRAM"
55 PRINT:PRINT
58 WIDTH 49
60 PRINT"    THIS PROGRAM WILL
 HELP YOU BUY YOUR GROCERIES L
ESS EXPENSIVELY. BY CREATING F
OR YOU A LIST OF AVERAGE PRICE
S FOR GOODS YOU BUY OVER A PER
IOD OF TIME, YOU WILL BE ABLE
TO BUY LOSS-LEADERS WHEN THEY'
RE REALLY LOW-PRICED, AND AVOI
D GOODS WITH"
70 PRINT"INFLATED PRICES.YOU C
AN ALSO APPLY THE GOVERNMENT-P
UBLISHED COST OF LIVING INDEX
TO YOUR PREVIOUS AVERAGE PRICE
S TO ARRIVE AT AN UP TO DATE S
ET OF PRICES."
80 PRINT:PRINT:PRINTCHR$(16);C
HR$(22);
90 DA$="NO DATE ENTERED.":INPU
T"DATE";DA$
100 INPUT"HOW MANY GROCERY ITE
MS";MAX
110 FORI=1 TO MAX
120 NA$(I)="***":PRINTCHR$(16)
;CHR$(22);:PRINTI;".";:INPUT"
ITEM NAME";NA$(I)
130 NEXT I
200 PRINT:PRINT:PRINTCHR$(16);
CHR$(22);
210 PRINT"OPTIONS:"
220 PRINTTAB(10);"NEW DATA"
230 PRINTTAB(10);"OLD DATA"
240 PRINT TAB(10);"HELP"
250 PRINTTAB(10);"END"
260 CO$="**":PRINT:PRINT:INPUT
"COMMAND";CO$:CO$=LEFT$(CO$,1)
270 IF CO$="N" THEN GOSUB 1000
:GOTO 200
280 IF CO$="O" THEN GOSUB 2000
:GOTO 200
290 IF CO$="H" THEN GOSUB 3000
:GOTO 200
300 IF CO$="E" THEN PRINT:PRIN
T"HAPPY SHOPPING!":END
310 GOTO 200
1000 REM *** NEW DATA ROUTINE
1010 FORI=1 TO MAX
1020 PC=0:TC=0
1030 PRINT:PRINTCHR$(16);CHR$(
22);
```

```
1040 PRINT"PRICE OF:":PRINTTAB
(5);NA$(I)
1050 PRINT"ENTER 'RETURN' WHEN
 ALL PRICES ARE":PRINT"INPUT F
OR ";NA$(I);"."
1060 PR=0:INPUT"PRICE";PR
1070 IF PR=0 THEN 1300
1080 PC=PC+1:TC=TC+PR
1090 GOTO 1060
1300 AV(I)=TC/PC:NEXT I
1310 N=1:PRINT:PRINTCHR$(16);C
HR$(22);:INPUT"NUMBER OF COPIE
S OF PRICE LIST DESIRED";N
1320 FOR Z=1 TO N
1325 PRINT:PRINT:PRINTCHR$(16)
;CHR$(22);
1330 PRINT"AVERAGE PRICES:":PR
INT"    ";DA$:PRINT:PRINT
1340 FOR I=1 TO MAX
1350 PRINTNA$(I);TAB(15);AV(I)
1360 NEXT I
1370 PRINT:PRINT
1380 NEXT Z
1390 RETURN
2000 REM *** OLD DATA ROUTINE
2010 PRINT:PRINT:PRINTCHR$(16)
;CHR$(22);
2015 PRINT"ENTER OLD DATA FROM
 PREVIOUS PRINTOUT:"
2020 FORI=1 TO MAX
2030 PRINTCHR$(16);CHR$(22);
2040 PRINTI;".  ";NA$(I);:INPUT
"-AVG. PRICE";AV(I)
2050 NEXT I
2060 PRINT:PRINTCHR$(16);CHR$(
22);
2070 AD=0:INPUT"ENTER COST OF
LIVING ADJUSTMENT, EXPRESSED A
S A  PERCENT";AD
2080 FOR I=1 TO MAX
2090 AV(I)=AV(I)*(1+(AD/100))
2100 NEXT I
2110 GOTO 1310
3000 REM *** HELP ROUTINE
3010 PRINT:PRINTCHR$(16);CHR$(
22);
3020 PRINT"TO USE THIS PROGRAM
,YOU MUST FIRST OBTAIN SEVERAL
 WEEKS OF ITEMIZED GROCERY SAL
ES SLIPS. MARK THE ITEMS WHOSE
 PRICES YOU ARE INTERESTED IN
ON EACH SALES SLIP."
3030 PRINT:PRINTCHR$(16);CHR$(
22);
3040 PRINT"NEXT, RUN THIS PROG
RAM. FIRST INPUT THE NAMES OF
THE GROCERY ITEMS YOU HAVE MAR
KED. THEN, FOR EACH ITEM, INPU
T ALL THE PRICES ON THE SALES
SLIPS."
3050 PRINT:PRINTCHR$(16);CHR$(
22);
3060 PRINT"THE AVERAGE PRICE O
F EACH GROCERY ITEM WILL BE
 CALCULATED AND PRINTED OUT IN
 TABULAR FORM."
3070 PRINT:PRINTCHR$(16);CHR$(
22);
3080 PRINT"TO OBTAIN NEW AVERA
GE PRICES AFTER A NEW COST OF
LIVING ADJUSTMENT, USE THE 'OL
D DATA' COMMAND.  FROM A PREV
IOUS PRINTOUT ENTER THE ITEM N
AMES AND PRICES WHEN REQUESTED
 TO DO SO."
3090 PRINT:PRINTCHR$(16);CHR$(
22);
3100 PRINT"THEN ENTER THE GOVE
RNMENT'S COST OF LIVING ADJUST
MENT EXPRESSED AS A PERCENT. F
OR EXAMPLE, ENTER A 1.5% INCRE
ASE AS '1.5'."
3110 PRINT:PRINTCHR$(16);CHR$(
22);
3120 RETURN
```

If you're missing any of these you have gaps in your data bank.

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City

BY ERIC OLSON

CITY demonstrates the PET computer's abilities in art. Some may question whether or not CITY is artistic, but it creates something pleasing to the eye. The pictures never come out identical, but are always similar.

By following certain simple rules, CITY draws pictures. It can only move in four directions: up, down, right and left. It prints one of four symbols depending on which way it last moved. The directions and symbols match up as follows: down-▄, up-▀, right-▐, and left-▌, giving the effect that each character printed lies as far away as possible from the character printed just before it. If a character exists where CITY wants to print, it prints anyway, destroying the old character. In this way the running program looks almost like a city, building and then rebuilding a minute later. To make sure the picture will not scroll off the screen, CITY counts lines and will not go below the bottom line. This system will not always work, however, due to PET's wrap-around.

CITY must be run on a PET computer because it uses special graphics and cursor functions available only on the PET. This program should run in 4K RAM, but I haven't been able to test it on anything but an 8K system.

One can hardly consider CITY perfect. Many things can be done to spruce it up, including: improving line counting, changing character sets, implementing diagonal movement, adding a timing routine, adding a provision to store pictures on tape, using artificial boundries and adding differing build densities.

CITY's line counter only counts linefeeds generated by the program. It does not take into account linefeeds generated by the PET when it goes off the right margin. To correct this, never go off the right edge of the screen. (Doing this eliminated wrap-around, though.) The alternative method of looking at PET's internal registers might work better. PEEK (245) contains the current cursor line address. If this register takes into account lines with more than 40 characters, it will work better than the system I used. In any case, it will work at least as well.

Initially, the program's character set creates the effect of a city being built. Different character sets yield different illusions. For instance, using a character set of ◪, ◹, and their reverses (◧ and ◺), the effect becomes one of a mad origami artist, folding paper in all directions.

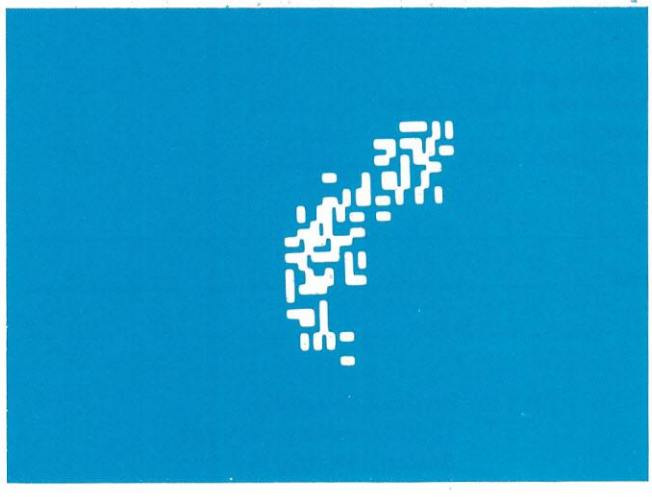
Diagonal movement could be added and the character set changed to ▀ (up), ◹ (up and right), ▐ (right), ◪ (down and right), ▄ (down), ◺ (down and left), ▌ (left) and ◧ (up and left).

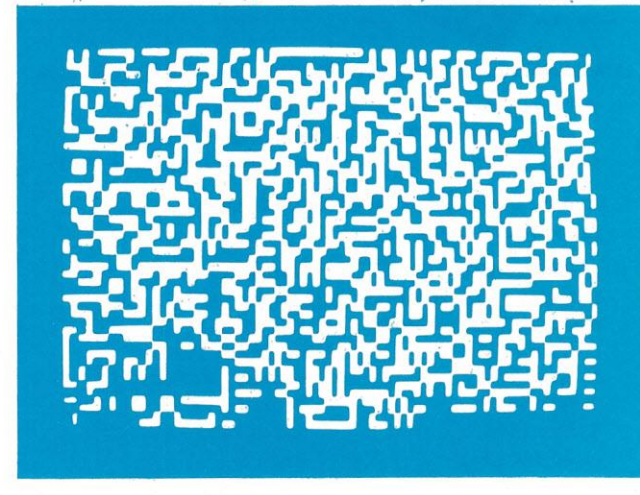
To put a timer in CITY, simply store TI (current time) in a variable, say US, before line 10. Remember that all these times are in "jiffies" (60ths of a second). Then compare TI to US plus the time you want the program to run (D). Compare every time CITY's cursor moves. If TI ⩾ US + D, then we should stop. Don't use STOP to halt the program though, because this writes "BREAK IN LINE nnn. READY" on the screen. Instead, put the program in an infinite loop. You can do this by going to a line that calls itself (10 GOTO 10). Then let the user stop when he wants to by hitting BREAK.

To save a picture currently on the screen, peek each screen location and write its contents out onto tape. To reload do just the opposite: read in characters and POKE their screen locations.

Artificial boundries add a greater sense of city building. Try different symbols for bays, lakes or parks, and modify CITY so it will not print over these. You could also implement a subroutine to draw these features randomly.

Real cities don't build as often in some areas as in others. Adding this feature to the simulation should challenge even an accomplished programmer. □





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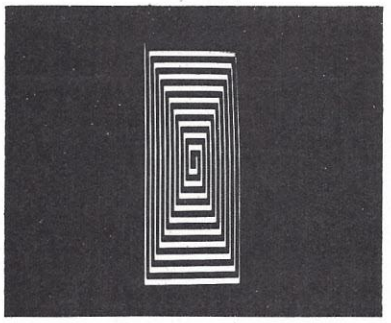

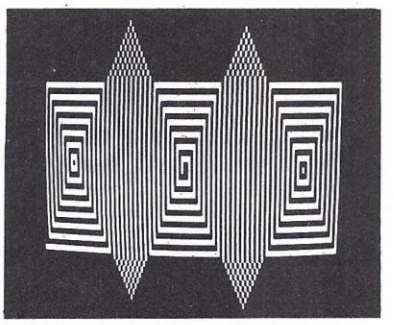

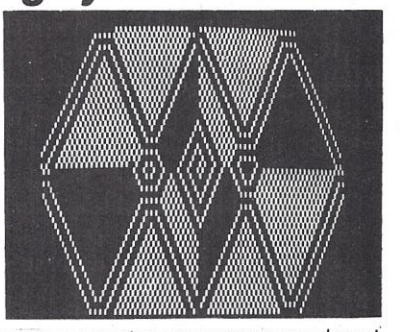

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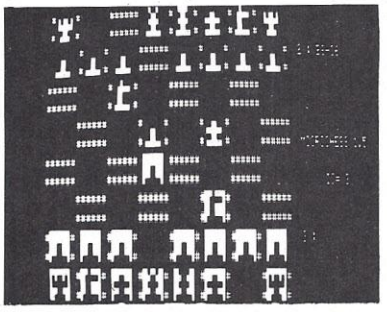

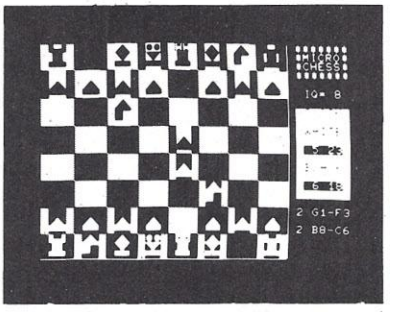

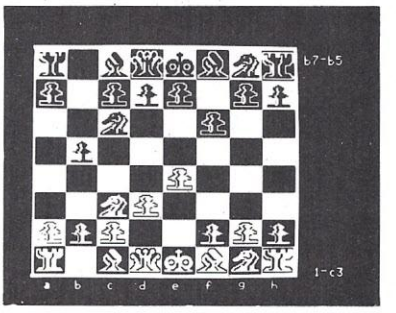

MICROCHESS is the culmination of two years of chessplaying program development by **Peter Jennings**, author of the famous 1K byte chess program for the KIM-1. MICROCHESS 2.0 for 8K PETs and 16K APPLEs, in 6502 machine language, offers 8 levels of play to suit everyone from the beginner learning chess to the serious player. It examines positions as many as 6 moves ahead, and includes a chess clock for tournament play. MICROCHESS 1.5 for 4K TRS-80s, in Z-80 machine language, offers 3 levels of play (both Level I and Level II versions are included and can be loaded on any TRS-80 without TBUG). MICROCHESS checks every move for legality and displays the current position on a graphic chessboard. You can play White or Black, set up and play from special board positions, or even watch the computer play against itself! Available now at a special introductory price of only **$19.95**

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CIRCLE 16

Program Listing

```
10 PRINT "□↓↓↓↓↓↓↓↓↓↓↓↓↓→→→→→→→→→→→→→→→→→→→→→→→→";   Center cursor on screen
15 L=12                                                Centered on line 12
100 D=INT(4*RND(1))+1                                  Direction and character: 1 to 4
110 IF D=1 THEN 1000                                   Down: Check for bottom of screen
120 IF D=2 THEN 1500                                   Up: Decrement line counter
130 IF D=3 THEN PRINT "→";                             Right
140 IF D=4 THEN PRINT "←";                             Left
200 IF D=1 THEN PRINT "■";                             Down character
210 IF D=2 THEN PRINT "R■R";                           Reverse of down character
220 IF D=3 THEN PRINT "R■R";                           Reverse of left character
230 IF D=4 THEN PRINT "■";                             Left character
240 PRINT "←";                                         Move to on top of character
250 GOTO 100                                           Loop infinitely
1000 L=L+1                                             Down: Increment line counter
1010 IF L=24 THEN 1040                                 Bottom of screen?
1020 PRINT "↓";                                        No, go down
1030 GOTO 200                                          Go to print character
1040 D=2                                               Yes, make direction up (2)
1050 L=L-1                                             Decrement line counter
1060 GOTO 110                                          Go to move
1500 L=L-1                                             Up: Decrement line counter
1510 IF L<1 THEN L=1                                   Are we hitting top of screen?
1520 PRINT "↑";                                        Go up anyway
1530 GOTO 200                                          Go to print character
9999 END                                               End of program
```

□	Clear Screen
R	Reverse
R	Unreverse
↑	Cursor Up
↓	Cursor Down
→	Cursor Right
←	Cursor Left

Watering Your Lawn by Computer

BY FRANK RONE

Routine tasks around the house that a microprocessor can control are turning some heads toward personal computing. Now not only can you use a microprocessor to do your income tax and to play games with, but you can also use one to water your lawn.

By connecting a programmable remote switching system such as the Coby 1 System to your lawn sprinkler system, you can program the sprinklers to come on at any time you want. If you also connect switching tensiometers to the spinkler system, the sprinklers will come on only when the lawn needs watering. You save the water, energy and money that are wasted by unnecessary watering.

You can program the Coby 1 remote switching system to turn any electrical device on and off. The Coby 1 consists of a control unit and up to 100 remote units. You program the control unit with simple instructions to send on/off signals to the remote units through your house wiring. Just plug in the remote units between standard wall sockets and electrical devices. Each remote unit recognizes its own signal and performs the programmed instructions for the device plugged into it.

The Coby 1 Control unit contains an Intel 8085 microprocessor, 2048 words of Random Access Memory (RAM), 2048 bytes of Read Only Memory (ROM), coding and signal generating hardware and a power cell. An internal clock, accurate to within seconds per month, keeps track of and displays the time. The power supply cell insures this clock will keep running if the control unit is moved or if there is a minor power outage.

Tensiometers measure the moisture content of soil. These instruments, long tubes with a porous cup at one end and a pressure gauge at the other, are partially filled with water.

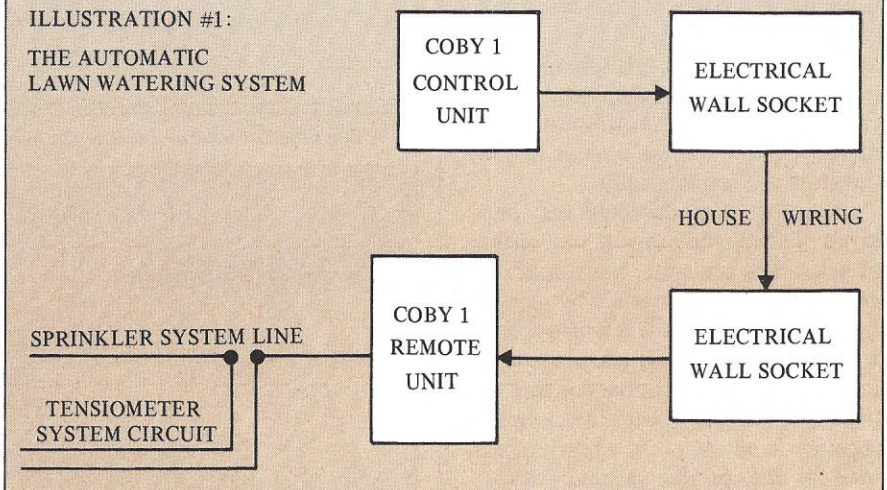
Place a tensiometer in the ground. As the soil drys, the water in the tube is drawn out through the porous cup by osmosis. The drop in water level decreases the air pressure in the tube, and the gauge on the tensiometer measures the soil's dryness.

A switching tensiometer, such as the Irrometer Turf Model TGA, activates an electrical circuit when the pressure gauge needle reaches a certain point. The pressure that activates the circuit can be set at any time and depends on the minimum amount of moisture desired for the lawn.

No knowledge of computer language is required to program the Coby 1 Control unit. Enter the number of the remote unit you wish to store the instructions for, then enter the dates and times you want to turn the device on and off. This procedure can be done for as many days as you like up to eleven months in advance.

You can program the Coby 1 to turn the sprinkler system on every day, every other day or however of-

ILLUSTRATION #1:
THE AUTOMATIC LAWN WATERING SYSTEM



The Coby 1 Control unit sends programmed signals to the remote unit through the house wiring. The remote unit then switches the sprinkler system on or off according to the programmed instructions. The tensiometer system circuit acts as an enable line so that the sprinklers only receive the Coby 1's instructions when the circuit is closed (the lawn needs watering).

ten you want. You can also vary when the water will come on and how long the water will stay on (if needed). For example, you may wish to program the system to water the lawn on fewer days, later in the day and for a shorter length of time in the cold, damp months than in the warm, dry months. You can save programming time, water the lawn during the most efficient time period and use the minimal amount of water.

To install tensiometers, first dig a small, rectangular pit. Then use a half-inch rod to make a hole for each tensiometer from the side of the pit into the soil. Insert the tensiometers horizontally into the soil and use a rod, knife or other hard thin object as a measuring device to make sure the tips are at the right depths. You should cover the pit for safety and to protect the instuments.

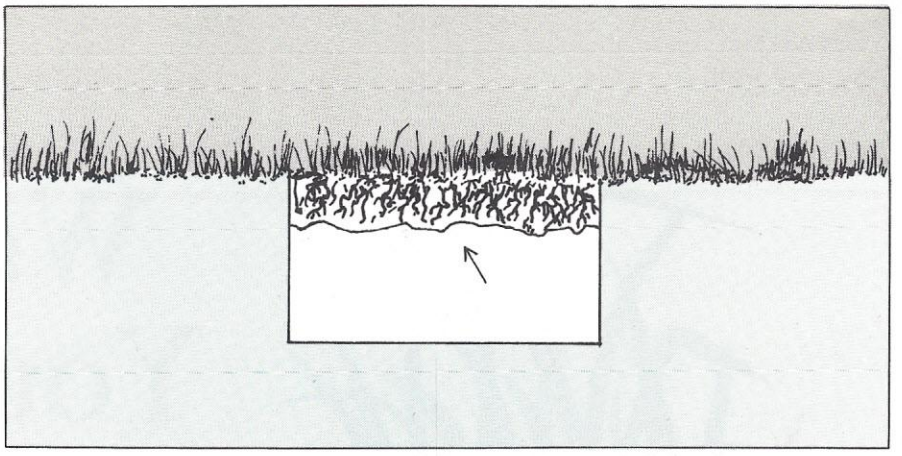
To determine the depth to place the tensiometers, check the root system of the grass removed to make the pit. When using a single tensiometer, choose an average depth of the root. You can install one tensiometer at a shallow root depth and one at a deeper depth (one to four inches deep and six to twelve inches respectively) if you use two per pit.

The height compared to the surrounding ground, the locations of the sprinklers and the amount of sunlight received should be taken into consideration when you choose a site to install a tensiometer. You should pick a drier area that gets more sun.

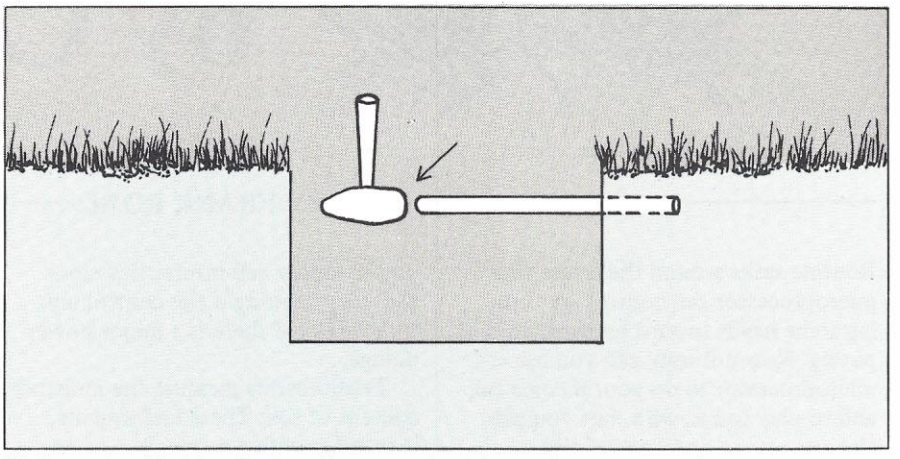
How many tensiometers you install depends on the size of your lawn and how you want it watered. You can use a system of tensiometers spread about different locations in the lawn, two tensiometers placed at different levels in one location or even a single tensiometer located strategically.

A system of tensiometers may be a series of single instruments or a series of pairs. You can water individual areas of the lawn as needed by using a system of tensiometers with a Coby 1 remote unit and a sprinkler system for each area. To form the control line for that system, wire the circuits together from each of the tensiometers used for one sprinkler system. However, you need more than one sprinkler system only if you have an exceptionally large lawn.

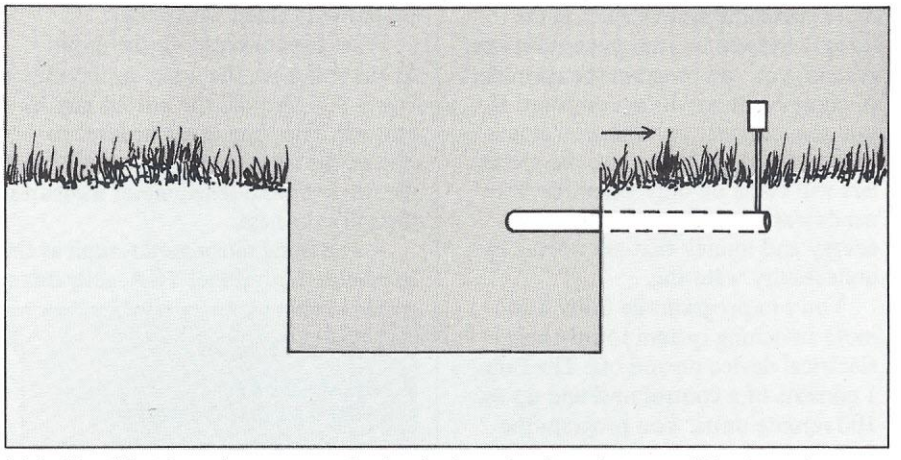
The length and depth of irrigation needed can be determined by two tens-



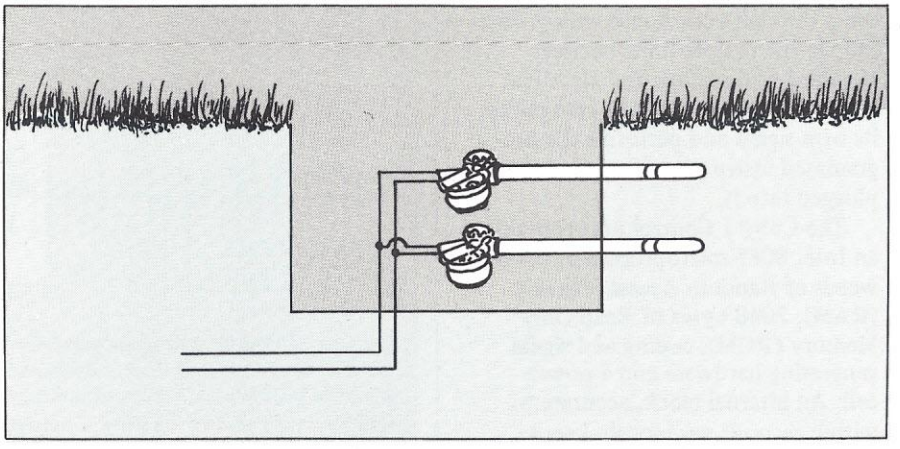
(a) A rectangular pit is dug and the root system in the sod is examined (arrow).



(b) A metal rod is driven in the soil at proper level for tensiometers (arrow).



(c) A thin object is used to measure the depth where tip of tensiometer will be (arrow).



(d) The tensiometers are then inserted and wired according to directions.

iometers measuring both the deep and shallow irrigation requirements. This information can then be used by the system to prevent excessive watering.

Installation and wiring for a single switching tensiometer is not complicated, but the sprinkler system receives a limited amount of information. You need to be careful in choosing the location and depth of the instrument; however, a single switching tensiometer would be very practical for a small lawn.

Interfacing the combined system can be done at a standard home electrical outlet. Connect the circuit from the tensiometer system into the switching line of the sprinkler system, plug the switching line into the Coby 1 remote unit and plug the remote unit into an electrical socket. The remote unit will receive the instructions for the sprinkler system as programmed, but can carry them out only when the tensiometer circuit is closed.

Remotes for the Coby 1 System are being designed to switch 24V control circuits. With the four amp switching capacity of the Irrometer Turf Model TGA, the amperage of a 24V circuit should be low enough to connect the circuit from the tensiometer system directly to the wiring carrying the instructions to the Coby 1 remote unit. An open tensiometer circuit would prevent the instructions from reaching the remote unit instead of the remote receiving the instructions for the Coby 1 Controller and not executing them. The Coby 1 Control unit costs $450 and each remote unit for a standard 115V outlet costs $51. A remote that replaces a standard wall switch and a remote that goes in a 220V line are available for $85 per unit. You can obtain the Coby 1 System or further information from Energy Technology, 204 Conway, P.O. Box Q, Las Cruces, NM 88001.

The Irrometer Turf Model TGA costs $41.50 per twelve-inch model and comes with a wiring diagram and irrigation recommendations. You can obtain the TGA or information on the Irrometer line of tensiometers from Irrometer Company, P.O. Box 2424, Riverside, CA 92506.

This lawn watering system is only the beginning of the variety of automation that you can bring to your home. The Coby 1 System can handle up to 100 remotes; use your imagination for the other 99. □

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CIRCLE 17

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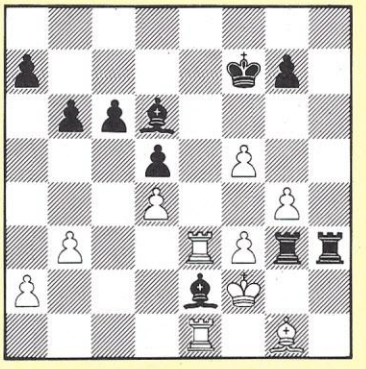
CIRCLE 18

COMPUTER CHESS

HARRY SHERSHOW – Dept. Editor
MORRIS MILLER – Chess Annotater

Annotations of annotations

The fourth game of the Levy vs. Chess 4.7 match at Toronto has revealed some unexplored possibilities. There was also a statement later made by Levy that he was playing the fourth game as an experiment, playing against the program with its own tactics. Supporters of CHESS 4.7 say it doesn't matter how David had played, he still would have lost with whatever method he used. This point, obviously, will have to remain a subject for perpetual contemplation rather than an issue that can be resolved. Upon reaching the 33rd move of the game, new concepts and new path directions opened up that had not been noticed in Toronto. The game had been struggling laboriously up to that point and at the 32nd move, the pattern of the chessboard had evolved into the following design:



Position beginning with White's (CHESS 4.7) 32nd move.

White- CHESS 4.7	Black- DAVID LEVY
32. R(K1)xB	P-B4
33. P-B4	RxR
34. RxR	R-R5
35. K-N3	R-R8
36. B-B2	R-Q8
37. R-R3	PxP
38. RxP+	K-B1
39. R-Q7	R-Q6+
40. K-N2	B-B4
41. RxQP	R-R7
42. P-N4	BxP
43. R-Q8+	K-B2
44. R-Q7+	K-B1
45. RxP+	R-N7
46. K-B3	B-B4
47. R-Q8+	K-K2
48. B-R4+	K-B2
49. P-N5+	P-N3
50. R-Q7+	K-B1
51. PxP	RxP
52. P-B5	R-R6+
53. K-N4	R-R5+
54. K-R5	R-Q5
55. R-QB7	B-K2
56. P-B6	(Resigns)

Without referring to errors in omission, transposition, and misinterpretation that appeared in PC's original story, the correct annotations — revolving around this vital fulcrum in the game — are shown here as again analyzed by Morris Miller. Also included is a rebuttal note from David Slate.

"The game has been fairly complicated up to move 32," observes Morris. "And it is difficult for me to see how Levy could have improved his play. He is a pawn down and every exchange helps the computer. At move 33, CHESS 4.7 cannot play PxP which will be followed by Black's BxP. So instead, he plays P-B4, as indicated. But at this point, an interesting variation develops that Levy fails to notice. He cannot play 33. . . . BxP; 34. R-K7+, K-B3? 35. R(K2)-K6+, K-N4; 36. RxKNP+, K-R5; 37. R-R7+ K-N4; 38. R-KN6 mate.

But after 34. R-K7+, K-N; 35. RxRP? Black can win by B-K6+ or even the effective 35 . . . PxP! because the White Bishop is now trapped. Also, 34. R-K7+, K-N; 35. K-B1, R-R8; 36. R-N2, PxP! and again the Bishop will be lost by Black's next move of B-K6. Several other variations, all leading to Black wins, are apparent. It's a pity that Levy overlooked this line of play."

After studying Morris' original notes, David Slate, of CHESS 4.7, responded with his own analysis:

"I think there may be an error in Morris Miller's analysis. He suggests that 33. . . . BxP wins for Black, analyzing only 34. R-K7 check for White. However, if White plays, instead: 34. RxR, then 34. . . . BxR; 35. K-N2 wins the Black Bishop. Also, 34. . . . RxR; 35. B-R2, Rx KNP; 36. K-B3 wins either the Black Bishop or the exchange. Black is certainly not winning after these variations!"

Morris' reply to David's analysis: "David is correct in his line: 34 RxR, RxR; 35-B-R2, RxNP; 36-K-B3 wins the exchange. However, it seems to me that Levy (Black) can still draw: 36-...BxB; 37-KxR, B-N8. (The position now is: White: K-KN4, R-K2, Ps-KB5, Q4, QN2, QR2. Black: K-KB2, B-KN8, P-KN2, Q4, QB4, QN3, QR2.) 38-R-K5, BxP; 39-RxP, BxP; 40-R-Q7ch, K-B3; 41-RxP, P-B5. Now; (A) 42-R-QN7, P-B6; 43-RxPch, K-K4; 44-R-QB6, K-Q4; 45-R-B7, K-K5; 46-P-R4, K-Q6; 47-P-R5, P-B7; 48-P-R6, B-Q5 or B-B6, etc. (B): Or 42-R-QB7, P-B6; 43-R-B6ch, K-K4; 44-K-N5, K-Q5; 45-K-N6, K-Q6, etc. (C): 38-PxP, BxP; 39-R-K5, P-Q5; 40-R-Q5, P-R4. The Black Bishop is reduced to the status of a pawn but if White brings its King over to the Queen side to sacrifice the Rook for Bishop and Pawn, Black can take the Bishop Pawn and push his Knight Pawn. However, on reflection I see this line is bad because: 41-K-N5 (threatening R-Q7ch and K-N6), B-K2ch; 42-K-B4, B-B4 (if instead 42-...B-B3; 43-R-Q7ch and R-QN7); 43-K-K5. If now 43-...P-N3; 44-P-B6. Otherwise White will play R-Q7ch and K-K6, followed by R-Q8ch and K-B7, then R-KN8.

"(D):Instead of (C): 38-PxP, BxP; 39-R-K5, P-Q5; 40-R-Q5, K-B3; 41-R-Q7, P-R4; 42-R-QB7 (directed against the threatened P-N3), K-K4; 43-RxP, P-Q6; 44-R-KR7, P-Q7; 45-R-R, B-B7; 46-R-Q, B-K6; 47-P-R4, K-B3; 48-K-B3, B-R3; 49-K-K4, B-N4; 50-K-Q5, KxP; 51-K-B6, B-K6 etc.

"I realize this is lengthy and hardly the last word on all the possibilities, but it does seem to me Black can hold the draw. There are other lines for Black but losing ones, for the most part. It shows the length to which analysis can go. This business of correcting the annotator's analysis goes on all the time — as you can see at ACM's annual Computer Chess Tournaments. In the past, some very eminent masters have

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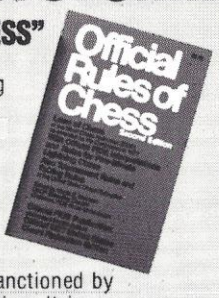

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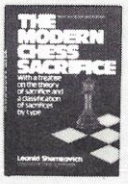

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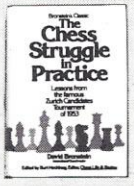

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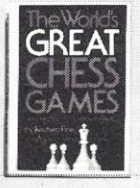

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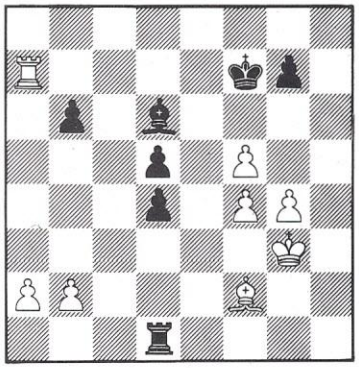
been proven incorrect in their notes, even to the extent of their overlooking rather simple threats. So, I guess I am in good company."

Another comment on this particular game came from Dr. Jack Good. In an article he wrote in CHESS LIFE AND REVIEW (November 1978), Dr. Good saw that if David Levy had played differently on the 38th move, he would have won the fourth game also, thus denying the computer any wins at all. "Levy mounted a strong attack," noted Dr. Good. "But the computer defended exceedingly well. I believe the computer was lucky that a good defense even existed. Levy did not play the best 24th move, but still had a win in his pocket if he had played correctly on the 38th move. The position at that time is shown in the accompanying diagram with Black (Levy) to move.

White-CHESS 4.7 Black-DAVID LEVY



Position at 38th move. Black to move. (See Dr. good's comments.)

He played 38 . . . K-B1 and, as he said later, K-K1 would have been better. He suggests in his article, that the continuation of 39. R x P, P-Q6; and 40. K-B3, R-QN8, would probably have been enough to win. But this is doubtful because White can afford to sacrifice his Bishop as follows: 41. K-K3, B-B4 ch; 42. KxP, BxB; 43. P-B6. White now has a very strong passed pawn on the sixth rank which, in my opinion, is worth a piece. It is Black, now, who is more likely to lose.

Instead, in this analysis, Black should play 40. . . . B-N5! If then, 41. B-K3, PQ5; and it is Black's Pawn that cannot be stopped.

Thus, Levy did have a win in his grasp on the 38th move, as he claimed. He would then have won the match by a score of 3½ to ½ and the historic computer-success story would have been postponed."

Meanwhile, not to be outdone by human analysts, the Cyber 176 Computer, predicted its own variations, according to Dave Cahlander of Control Data. After Chess 4.7's 33rd move the computer predicted:

33. . . .		RxR
34. RxR		RxR
35. KxR		PxP
36. K-Q3		BxP
37. BxP		

(But the computer was only 25% close to the actual moves!)

Evan on tour

. . . Recently, Evan Katz, who will be giving an analysis of microcomputer-chess at NCC's June conference in New York, went on a trip to England. He sent along this report of his experiences:

"Just before I left, I had the good fortune to get through to Kathe and Dan Spracklen. I learned their lawsuit against a company, accused of bootlegging the SARGON II is moving along rapidly. The improved SARGON II is almost completed, Kathe told me, with a vast improvement in positional evaluation and judgement and with a quicker search that almost doubles the number of look-ahead plies.

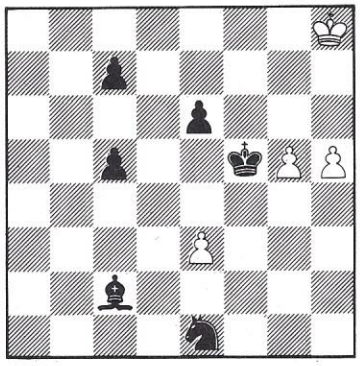
"Before leaving, I also received a pleasant letter from David Slate who tells me that his new CHESS 5.0 has not reached the same level of its predecessor, CHESS 4.7. But David says that CHESS 5.0 is theoretically capable of overtaking all programs that do not think like human masters. It's modular, flexible (can be used on different computers), and uses many more selection limitations. I have great faith that chess algorithms of this type will some day achieve equality on a grandmaster level.

"While in London, I spoke at length with David Levy, a wonderful guy. We discussed almost every chess program on the market and I was quite honored to hear that he holds the same opinion that I do. I was very interested and amused at his description of the disadvantage he suffered psychologically at the Toronto challenge match. He had to contend with an unseen opponent, a robot arm, and noisy press coverage. We discussed his new, heavily wagered 1983 match and I openly confessed that I personally considered his chances in a fair match (around ten games) to be quite slim. When he mentioned the vast number of pounds he has bet, I asked him which side he had bet on. At that point, David would have been justified in throwing me out. But, as I said, he is a wonderful guy and he took my slight rib-nudging in good humor.

"I was also able to visit Mike Johnson, of the MIKE program. It wasn't an easy task to get to him as it took me two train rides from where I was staying and required more than two hours of travel time. Mike, I discovered, has a veritable 'mess' of computer equipment in his apartment. I played two 'test' games against his program just to see how it played. The time was set to 30 seconds for each side to move. Mike is coming out with a new version that plays its best game at two minutes. He calls it Version 4.2. MIKE used my clock time to start a search based on my next 'expected move.' Simple alpha-beta pruning is utlized and the search runs from 3 to 8 ply. Quirks that are being rectified include en passant capturing, no more 'capture king, then resign,' (which happened in one of our test games) and tremendous improvements and additions to the few current heuristics and evaluators. Book openings and endings may be stored on disk for retrieval. Mike is going to convert his program for the 6502 (Pet and Apple) and market it in Great Britain. His clock speed is 1.5 but on a faster processor (around 4.0) the new program should really take off. The cost factors in England are discouragingly high for computer hobbyists. Equipment in computer, photography and audio fields are from 50 to 150 percent higher here than in the States. Mike actually has his parts sent to him from the States."

On Botvinnik's Program

. . . There have been a few challenges to the "Botvinnik Computer Problem." Typical of these challenges is the letter from Thomas Chassereau, 1345 53rd Ave., Oakland, CA 94601. "I think your magazine is of great interest," writes Tom. "And I enjoy reading it, not only for enjoyment but as a supplement to my college education with a major in Data Processing and a minor in Math. I have been playing chess for over 20 years and I am astounded by the solution given to the Botvinnik End Game, as solved by his PIONEER program!" (See the diagram for original position.)

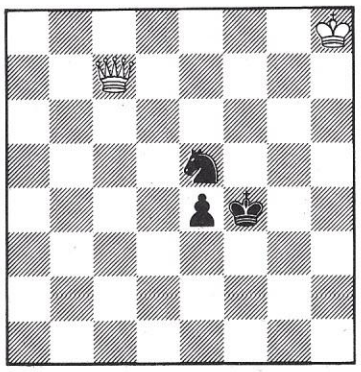


Original position of Botvinnik's endgame problem with White to win as solved by the PIONEER Computer program. (1. Pg5-g6; Kf5-f6;1. Pg6-g7; Kf6-f7; 3. Pg7-g8=Q and White wins.)

"I admit that the solution as given would work, but I doubt if Black would blow the game for a machine. My solution follows:

White	Black
1. P-g6	P-e5
2. P-g7	B-B3 (a)
3. P-g8(Q)	BxQ
4. KxB	K-g5 (b)
or	
3. P-h6	N-f3
4. P-h7	K-e4
5. P-g8(Q)	BxQ
6. PxB(Q)	KxP
7. Q-d5	P-e5
8. QxP ch	K-f4
9. QxP ch	N-e5 (c)

(a) Bishop can now be exchanged for the new Queen.
(b) No way White can win!
(c) From here it looks like the best White can hope for is a stalemate!"

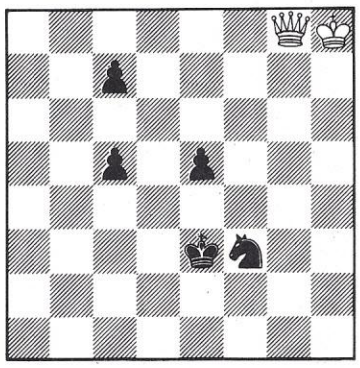


Position after Tom Chassereau's 9th move for Black (N-e5)

The tree search seen in Botvinnik's "map", continues with White's *best* responses. In the opinion of Botvinnik and his program, the move of Pe6-e5 is not very promising and if carried out to a terminal value would probably be too high to offer any hope of success. If this were not so, Botvinnik surely would have implanted the Pe6-e5 move onto the tree. Studying the map of the tree reveals that the program does not like the move of Bc2-b3, but at the 3rd node of one variation Black prefers Bc2-h7 which it considers a better move. The program at no point considers Pe6-e5, but does play Pc5-c4 on the 9th node of one variation and on the 11th node of another. The move of Ne1-f3 is considered at the 3rd and 5th nodes of two variations. It considers Ne1-g2 to be a better move which it tests in the 1st node of a variation. In all but 13 out of the 63 plotted variations the program indicates that White emerges victorious. The 13 Black-wins would occur only if the game moved along those paths of disaster. However, the program is "trained" to force the game along the path which leads to the lowest possible score for itself (+3). As seen from the map, the program can also win in 13 moves with a positive score of 198. The map is reproduced again here for reference. What might happen if Black does move Pe6-e5 (not shown on the map)? Morris Miller analyzes the possibilities as follows:

"With regard to the Botvinnik ending, Botvinnik is right although he might also have shown the line 1-P-g6, P-e5. The continuation would be: 2-P-g7, B-b3; 3-P-h6 and Mr. Chassereau gives an analysis which is correct up to that point. From here on: 3- . . . N-f3; 4-P-h7, K-e4; 5-P-g8=Q, BxQ; 6-PxB=Q, KxP. (See diagram.)

In this position I don't like the continuation given by Mr. Chassereau. To go after the doubled QB pawns is time wasting. Theory calls for quick mobilization of White's King to the scene of battle, which is going to be over the King Pawn. This will be coupled with checks which will centralize White's Queen and possibly pick up the Bishop Pawn with check. If Black's King Pawn were further advanced, there might well be a draw only. White, however, cannot waste time but must bring his King up. To gain time the Black King must be checked and forced to, say, f4 when White's Queen takes the Pawn at c7. Continuing now, 7-Q-b3 ch, K-f4; 8-Q-f7 ch, K-e3; 9-QxP, P-e4; 10-QxP ch, K-d3; 11-Q-f2. Now the Pawn cannot advance; 11- . . . N-d4; 12-Q-fl ch, K-d2; 13-Q-c4; or 12- . . . N-e2; 13-Q-el ch. In either case Black cannot advance the Pawn and the King can approach from h8. This is typical of the methods White must employ to prevent the Black Pawn from becoming a threat. This is by no means an exhaustive analysis.



Position after Morris Miller's 6th move of the analysis (. . . KxP)

Incidentally, in the line proposed by Mr. Chassereau, the final diagram he shows gives a clear win for White!. 1-K-g7, P-e3; 2-K-f6 and will take the Knight with check and an easy win.

The line I showed concentrates on Black's trying to push his King Pawn."

Aw, cut it out!

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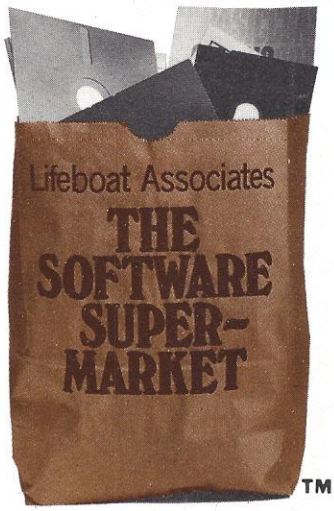

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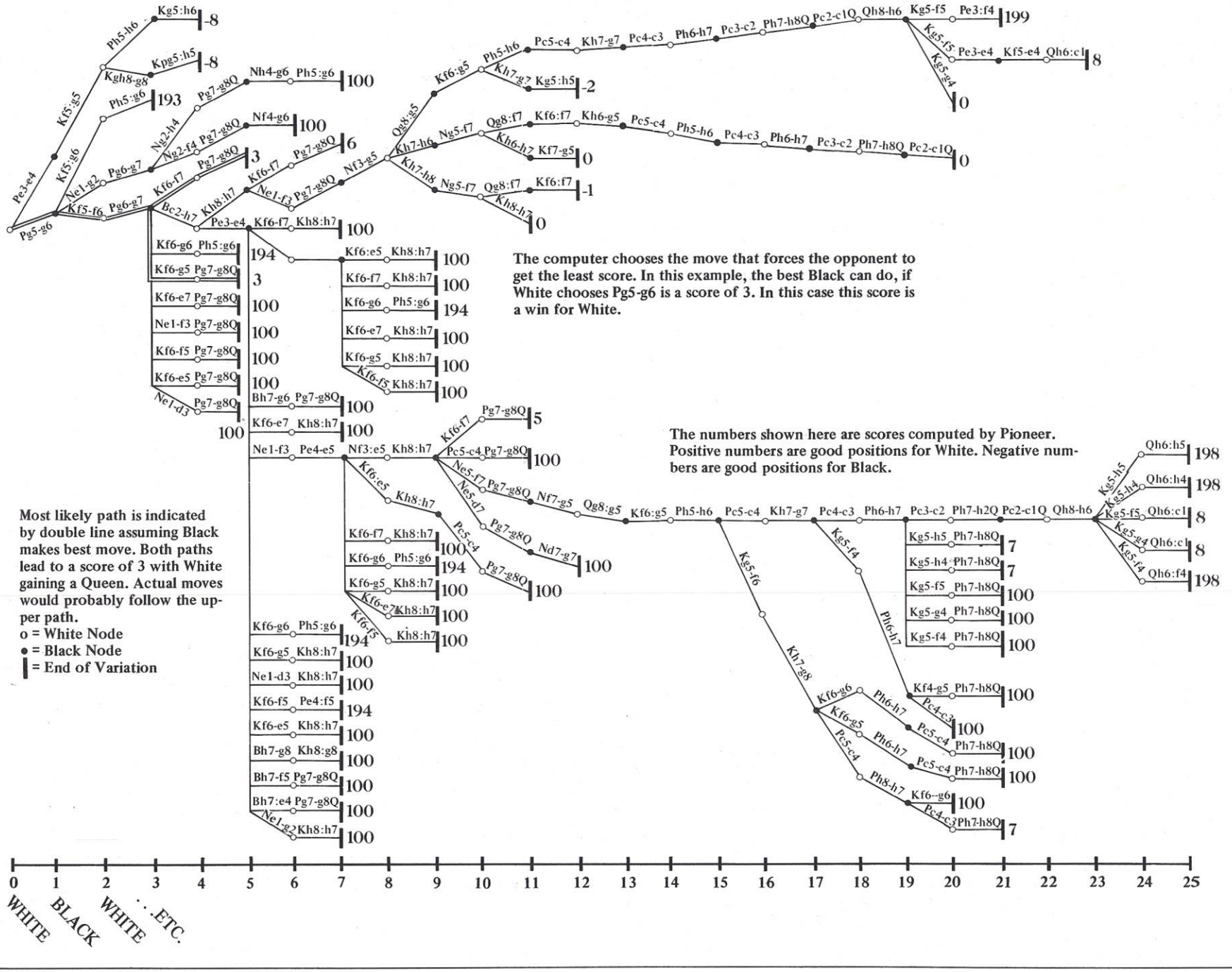


Computer GO Has Come

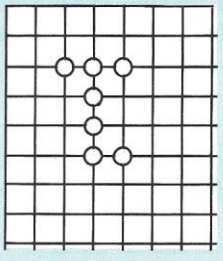
. . . . . In response to frequent requests for reports on Computer GO, we have obtained information from various sources, including a documented game between a computer and a human (which was won by the computer.) Because of the complexity of the 4000-year-old game, writing a computer GO program has always been more of a challenge than writing a program in computer chess. Several people have been able to accomplish this feat, called a remarkable achievement for the computer. Among those who have worked on GO programs are Jon Ryder who wrote his program at the University of Stanford under supervison of Professor Samuel, one of the first researchers to program a computer (IBM) to play checkers. Earlier work on GO programs has been done by Al Zobrist whose numerous articles appear in the journals of Artificial Intelligence. A current program in active use is one written by Walter Reitman and Bruce Wilcox at the University of Michigan. Another recent one was written by members of the Computing Science Department of Washington State University by David Benson and J. Denbigh Starkey. There are others which will be described in future articles.

GO is played on a large board with 19-x and 19-y coordinates, forming 361 intersections which become the playing points. Each player has 181 small flat stones, which are the playing pieces. One plays White; the other, Black, and Black moves first. Black puts one of his stones somewhere on the empty board. Once played, a stone is never touched again, unless it is "captured" and taken off the board by the opponent. White then puts one of his pieces on the board. White will try to weave a trap around a Black piece (or a group of Black pieces) by putting stones all around the enemy. Once White has encircled a piece he is recorded as having captured it and can then take it off the board. Black will, of course, be trying to do the same thing. With 181 pieces per player and each piece being moved only once, the maximum number of moves for the game will be 181 total moves, or 362 half moves. This is a feature possessed by no other game: knowing exactly the limit of the number of possible moves. Most GO games, of course, can be finished in fewer moves than the maximum.

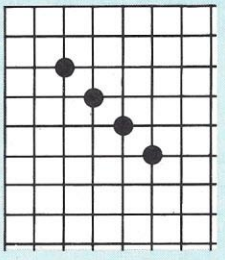
GO (also called "I Go") is currently Japan's most popular board game and is hotly contested both in public matches and in televised tournaments. The game originated in China about 2300 B.C. — and was brought to Japan around 500 A.D. The flat round, playing stones are called "Go-ishi". Object of the game is to conquer the enemy's Go-ishi (each captured enemy stone is worth one point to the victor) or to capture territory (surrounding vacant territory is worth one point for each intersection.) If Black should succeed in surrounding a vacant plot of five intersecting grids he gets five points and this captured "territory" cannot then be invaded by the opponent. Therefore it obviously is more advantageous to capture territory than to take captives. An enemy stone is captured when it is completely enclosed by opponent's stones.The final score is a player's number of walled-in points (captured territory) minus the number of his own stones lost by capture. The game ends when the players agree that "ownership" of all points on the board has been established. If a player disputes ownership of captured territory, he can invade the adversary's space and establish a live group in the area. Captured players are removed from the board at once; "doomed" forces are removed at the end of the play. Vacant intersections connected to both colors belong to neither side. An "eye" is a point surrounded by four men of the same color. A force with two separate eyes is safe,

Examples of position designations on the GO board:

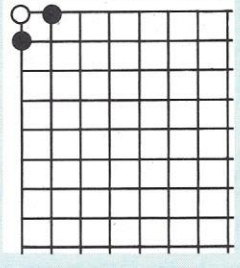
Men "live" as long as they are connected to at least one vacant intersection; they "die" if they are completely enclosed.



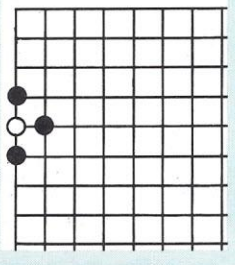
Two men are connected if they are adjacent on same *vertical* or *horizontal* line. The white men here are "connected":



In the above position, the black men are not connected:



White man is "dead"



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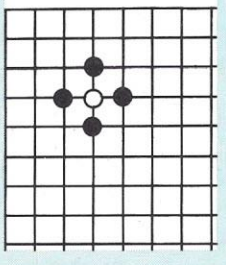

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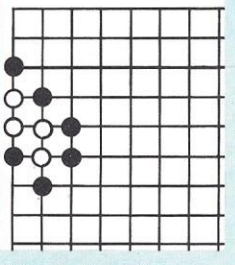
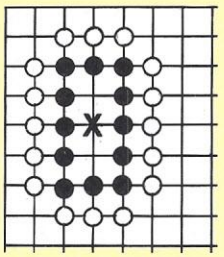
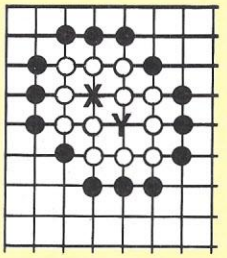


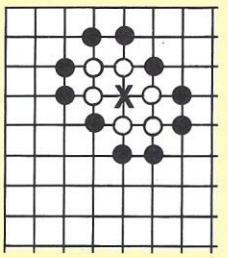
White men are "dead".



Black saves his men above and his space with a move to "x" if it is his turn. If it is White's turn he can win the group starting with a move to "x".



Whites, above, are forever safe because Black loses a man by playing to "X" or "Y" (because he is then completely surrounded and neither the "X" or "Y" play kills the White men). An eye is a point surrounded by 4 men of the same color. A force with 2 separate eyes as above is safe.



A surrounded force with one eye is doomed. Whites above are doomed. Black wins men and space by playing to "X" and killing White forces because White is then completely enclosed by formations of adjacent, "connected" uninterrupted Black men.

Chess Program, Part XI

This complete dissertation by Mike Valenti on how to write a computer chess program is presented in monthly segments as a guide for those wishing to write their own programs. Although designed to be run on a large computer, this program with proper modifications can serve also as a model in writing a chess program for smaller memory — systems — even the microcomputer. This program is written in BPL (modified XPL), but it can be written in other languages as well — with proper transitions.

Check for Draw

This routine checks the last twenty board positions for a duplicate position and sees if it is about to make the same move from that position. If that is the case, then it checks the material advantage and the value of the next best move. This is done to decide whether to play for a draw or to change the line of play. Some problems with this routine are detailed in upcoming sections.

This routine references the last twenty positions ("Past Position Storage") which are saved in a doubly-linked circular list shown in accompanying figure. The take-back-a-move command ("TB", as explained later) also references this list.

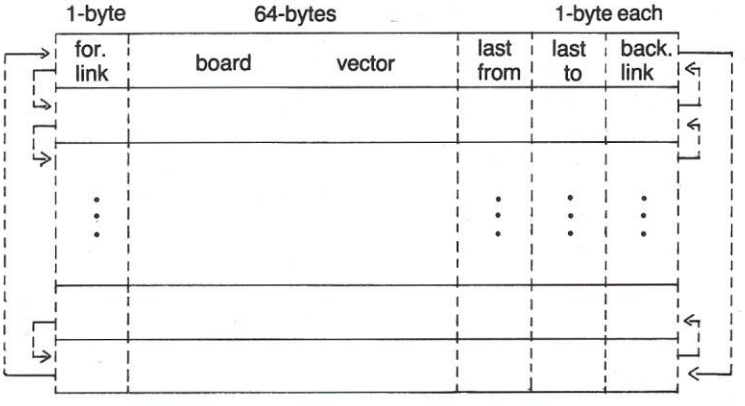
Move Scanning

There is a rather large part of the program code (approximately 20%) devoted to scanning moves and processing commands. This routine is named "MOVE-CONVERSION" and the commands and chess-notations that it processes are detailed in a later discussion.

Extensions and Limitations

Now we outline some of the program's weaknesses that it has displayed in competition, and also some possible extensions to the program. The program's play is certainly not at the expert level, but it seems to be competitive with some other computer chess programs. (Sample tournament games against other computers will be shown later.)

These proposals are intended as rough guidelines toward improving the program's play. The chess specific strategy is contained in the program's heuristics and its basic look-ahead strategy. One must become very familiar with the program's style of play before effecting major changes in these areas. The program's "style of play" is comprised of the heuristics and their relative weights, and the look-ahead algorithm. These topics will be discussed next month.



PAST POSITION STORAGE

The information is stored as a 67 by 20 array for convenience. The forward link ("for. link") contains the index of the next position while the backward link ("back. link") contains the index of the last position. The list builds from top to bottom, and then loops around, overwriting the old positions.

"Last from" and "last to" are the from and to-squares of the move leading to the current position. The current list index in the program contains the index of the last position and move.

Chess Chatter

Betting on Levy

....Writing in Chess Life and Review, David Levy, well-known in computer circles for consistently beating the best computer chess programs, says the computers are learning fast. He suggests that the time when computers achieve grandmaster ratings is approaching at a rate faster than generally believed. "The inevitable increase in the speed of computers during the next few years will certainly make the strong programs even more tactically adept than they are at present," he writes. "A sixfold increase in speed corresponds to an extra ply in depth of search." Levy is currently willing to risk up to $10,000 that he will not lose a *match* to any chess program before January 1, 1984. However, he is limiting the wager to units of $1,000 and will only bet against his personal acquaintances.

Challenger Analyzed

....Carl S. Webber, of 670 West Valley Road, Wayne, PA, 19087, writes: "For the benefit of 'A' level or better chess players, I report the following findings about my new Chess Challenger-10: 1. Castleing has been omitted from the machine's play. If you want it to put up its best struggle you must *make* it castle using the problem-set-up keys. This takes away some of the fun, but obviously enables the machine to play better. 2. The program has not been designed to play endings in which there is little material. For example, it cannot mate with King and Rook against King at *any* level except 'Postal' — possibly. At 24 hours a move I haven't had time to test this level. It *can* mate with Queen, breathing very hard, at level 8. 3. The program does not appear to give sufficient weight to the dangers of having its pieces pinned, and often does not try to extricate itself when it has a reasonable opportunity. 4. The number of plies varies from level to level and goes from 1 ply at level 1 to 4 play at level 10. Level 7 has the most plies (6); followed by levels 5, 8 and 9 (all with 5). I haven't determined what heuristic differences exist between the three 5-ply levels. In general, I prefer to use the 8th level. 5. Within the preceding limitations, Chess Challenger-10 is a remarkable device and offers a lot of playing fun. I'd be very interested in learning how other consumer-level chess players (like BORIS) compare in ability, style and program completeness."

(During the June NCC Conference in New York, Evan Katz will be comparing the various programs, and program-playing-chess-units during the PERSONAL COMPUTER FESTIVAL sessions there.)

Blitz Chess

. . . At Blitz Chess, computers, it has been generally conceded, have an advantage over a human with their overwhelming speed and memory. It is no surprise, then, to see well-known grandmasters go down to defeat at Blitz Chess when up against a strong computer program like CHESS 4.7. Morris Miller, himself once a player at the grandmaster level, sends along some thoughts on this phase of the game:

"Blitz chess, I suspect, is not true blitz when playing a computer. It takes at least three seconds, I suppose, to get the computer's move and make it, whereas true blitz is almost literally move on move. Also, the definition of blitz might differ. For example, there is five-minute chess, in which the player whose five minutes ends first, loses.

"A computer program does better at blitz than at tournament chess; the reverse being true for a human. This reminds me of a story told me by a chess friend of mine many years ago. He knew the late Dr. Emanuel Lasker, at that time already retired from tournament chess. In playing ten-second chess, my friend, a master, was able to beat Lasker. Lasker then proposed playing at the rate of a minute a move, and my friend was unable to even get a draw. Lasker's play was so deep that my friend could only see what was happening when it was too late.

"One other thing occurs to me (perhaps I am wrong, but Levy may be partly responsible). Levy has suggested that the best way to play computer is to play unorthodox lines, especially in the opening; this, to avoid the 'book' programming. I suspect this notion may have limited value. There are enough variations in the well trodden paths, so much so that even a grandmaster can go wrong. To go utterly unorthodox is like using an elephant gun to kill a flea. No program can have the complete MCO or PCO in its book.

"A program can reach a conclusion faster, but it will be based upon incomplete knowledge. No matter how thorough a computer's library is, human chessplayers who have been at it for years, as most devotees have, have self-programmed themselves (and their opening knowledge) for a much longer period of time. Therefore, it would be all right to play the opening unorthodoxly in a tournament game, but not in a blitz game. I would like to see a strong player test this idea out.

"I have just played over a game I noticed in the book 'Chess Skill in Man and Machine' by Frey. It is a blitz game between Chess 4.6 vs Stean, a grandmaster. This game seems to me to bear out my comments. Stean played as he would not play against a human; that is, he tried unorthodox opening play and wound up in trouble. Straightforward opening play would have served him best."

Improve the Art

...."I have some suggestions on improving the state-of-the-art performances of chess programs on true-blue, 8-bit microprocessors," writes James Trela of 126 Fort Pleasant Ave., Springfield, MA 01108. "This effort should be for the average microcomputer owner, not for an LSI-11 with a disk! By the way, I do not know how to play chess! First of all, I have seen a new microprocessor advertised by Intel: the 8048-11 megaherz! (I think this would require high-speed bipolar memory.) Secondly, the Spracklen's program SARGON should be translated from its Z-80 instructions to the 8048 instructions. I'm sure a program could be written in BASIC or FORTRAN to do this. With a fast memory that wouldn't hinder the 8048, I'm sure the 2-megaherz to 11-megaherz improvement would make quite a difference. Thirdly, if it doesn't do so already, SARGON should be improved so that it generates a 'pruned' look-ahead tree of the opponent's moves to

predict what he will do. Fourthly, with the force of new copyright laws to keep a hold on the present program, the current SARGON should be translated into 6502, 6800, 8080, 9900 and 8048 instructions. Finally, an obvious brute-force method for improvement would be to expand the starting move table of SARGON and implement it with a size of at least 8K to16K."

Problems with Problems

....The February solution to the end game problem printed in January did not meet with unanimous approval from readers. F. Gerlach, PO Box 9305, Ft. Lauderdale, FL 33310, sent this letter of dissent. "Come on guys! The February solution is not the answer to the January puzzle. After 6 PxB the Black King escapes to QB6! Furthermore, if you must use both algebraic and English notation, how about just *one* form of each?"

(On the use of notations, there is general agreement among chess scorers, that the source of most errors occurs when transposing from one form to another. So, in an attempt to keep errors down, we print the games as we receive them. Often, English notations differ from each other; and often algebraic notations also show differences. Until a single unified system is adopted and used internationally by players, less errors should appear when games are reproduced exactly as they are recorded at game time. On the matter of the solution to the problem, we wrote to Alan Gottlieb, whose column in MIT's Technology Review originally carried the problem. Alan's response, which also appeared in Technology Review, follows:)

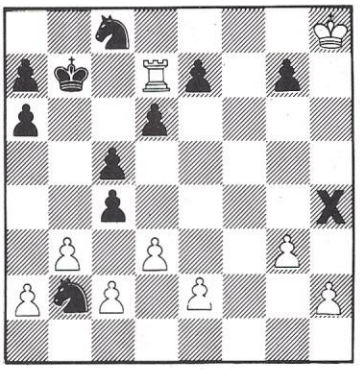
This is the correct solution -

1. N-QB7ck	K-Q5
2. R-B4ck	PxR
3. P-B3ck	PxP
4. PxRck	PxP
5. R-K4ck	PxR
6. B-K5ck	PxB
7. N(Q6)-N5ck	RxN(a)
8. Q-Q8ck	Q-Q3(b)
9. QxQck	B-Q4
10. QxBck	PxQ
11. NxRmate	

(a) If PxN, White's penultimate move is mate.

(b) If B-Q4, skip the next move "This is a beautiful mate," observes Alan. "Try it." Afterwards, try the following unusual problem, also from Alan Gottlieb's "Puzzle Corner" in M.I.T.'s Technology Review:

Given a game consisting of all legal moves terminating with the board as shown — what chess piece (black or white) is at x? (Answer next month.)



Romanian Postscripts

....Now that the public chess-game in Romania, between the computer (Felix 256) and readers of the newspaper Magazinul has ended, our correspondent, U. Friedberg, sums up what went on:

"The chess game between readers of the Bucharest weekly Magazinul and the Romanian Computer Felix C-256, which ran the ASTRO 64 program — a program written by mathematician Viorel Darie of the Research Institute for Computing Technique in Bucharest — has finally come to an end with a defeat for the computer. The computer made an error in its game and could never recover.

"Hundreds of thousands of readers of the magazine, chess players and non-chess players, computing scientists and other professionals, all took great interest in the game. Almost 6000 letters from more than 350 readers were received during the progress of the game. One of the readers was a 70-year-old retired engineer, Gheorghe Doina from Oradea, who, being an amateur fisherman, analyzed the game while sitting on the bank of a lake — with a line in his hand. The youngest chess player to compete was 6-year-old Cristian Darius Chirciusan from Tirnaveni. Cristian, not able to write yet, asked his grandfather to record the moves for him. Students of the Faculty of Medicine in Craiova, during their usual Saturday night meetings, took weekly votes on upcoming moves against ASTRO 64. The moves were then sent to the paper.

"As letters were received each week, move-choices were counted and the majority determined. This move was then fed into the computer which responded with its own move. Both moves were then printed in the newspaper to await the following week's developments. At the same time, starting with the 17th move of the 34-move game, a chess master analyzed the new moves of the game and revealed his own predictions of moves. This produced two contests among the readers: could they suggest a move that would be in the majority and, also, could they guess how the master would play? The first winners (decided by tabulating the letters) were granted a game of chess against the computer? This was a prize which, according to the readers, was more desireable than a reward of money or material.

"Asked what moves he would have made if he were the computer, Grandmaster Fiorin Gheorghiu answered that to 1. P-K4 he usually replied 1....P-QB4 and not 1....P-K4 as did the computer. However, he said, he might sometimes answer 1....P-K4 as in two games he played as Black against Bobby Fischer. In such cases he made the same first three moves that the computer had made. At the 4th move, however, he never answered 4....P-QN4 but 4....N-KB3. In Fiorin's opinion, the best chess programs in the world have already reached the level of candidate for master. Chess-master Emil Ungureanu praises the play of ASTRO-64 but criticizes it for being 'too concrete, tending to capture everything!' Chess-master Emmanuel Reicher, a computing scientist and chess coach, stated that if he had a computer for a pupil in his chess class he would first teach it how to defend itself. This was a subtle hint from Reicher that ASTRO 64 had neglected its defense and as a result, lost the game. Readers are already asking when the next computer match will be held. They are curious to see if the machine has learned anything — or improved its line of play."

Time Wasting

....Evan E. Alger, of R4, Benton, KY 42025, thinks that computer chess programs waste too much time. "It seems redundant," he writes. "That a computer should repeatedly conduct a search through all of the possible subsequent moves before making the next move. For any given chess position there must be either a best move, or several equally good ones, which could be taken at random. Therefore, the present position of the chess pieces should be the indication which would recall the correct move from a pre-programmed memory bank. This might require the design of a special circuit board that could assign a numerical index to every possible chess formation, so that the required move could be selected from a pre-programmed memory. The play would then be without delay, for all of the extensive trial and error research could have been explored during the programming of the memory. Note; The memory would not have to be as extensive as believed! Although there are many possible chess positions, there are not as many possible moves!"

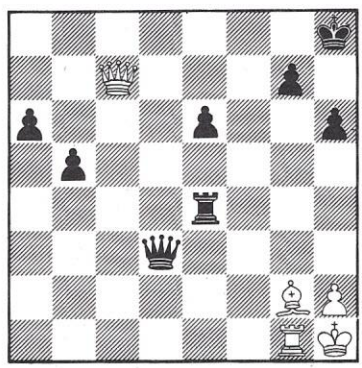
8080 Where Are You?

....In the report on the 9th ACM Computer Chess Tourney in Washington, SARGON and MIKE were listed as being the first microcomputers to be entered in an ACM tournament. Forgotten, for the moment, was the historical fact that Processor Technology's 8080 Chess Program had competed in the 1977 North American ACM's Computer Chess Championship and had won one of its four games. It was forgotten in the last ACM report because not much as been heard from "8080" since the Seattle, WA tournament. Nevertheless, "8080" does have the distinction of being the first microcomputer to compete in an official ACM tournament.

Sounds from Chess Voile

Chess Voice, is the official magazine of "CalChess" (Northern California Chess Association) 5804 Ocean View Drive, Oakland, CA 94618. Editor of the magazine, rated as one of the best in the chess-publications world, is John Larkins. A large variety of subjects is covered in the magazine including feature stories of world interest, analysis of championship tournaments, computer chess interviews with world champions, grandmasters views, annotated games and such delightful things as free chess courses. The most recent course concerned end games and was presented as a series of five lessons. Upon completion of the course and submission of correct answers to the problems, certificates were to be presented to successful "students." Following is one of the problems in the first lesson: (Answer elsewhere):

White to move. Eventual checkmate.



The following letter on computer chess appeared in the December '78 issue of CHESS VOICE:
"I enjoyed David Cahlander's recent article 'Man vs Machine' in the Oct.-Nov. issue, but I do have a question. Comparing the 'predicted variation' with the actual game score, I noticed from time to time that there is a deviation in the computer. For example, in one of the games shown, at move 33, the 'predicted variation' was 30.... Ba6, 31. Ne2, Be2; 32 R1e2, c5; 33. de. But when it got to move 33 in the actual game, the computer played 33. f4. Why is this so? I noted also that the computer in some instances 'changed its mind' quite early in a sequence."- Ray Alexis, Reynoldsburg, OH. Response from Editor John Larkins: "Ray Alexis is editor of 'Chess 'N Stuff. As I understand it, Ray, the discrepancies are caused by changes in the 'move horizon' of the computer. When Chess 4.7 was at move 30, the predicted variation was the best among all the four-move continuations it examined. But at move 33 the machine could now see four moves further ahead (to move 37) bringing new information that it had not seen before. So, it 'changed its mind.' Just as we would."

Judging Programs

....Bruce Godchaux, 101 Hilborn #6, Vallejo, CA 94590, thinks that chess programs should be judged on their accomplishments alone. "The program should be evaluated by how well it does what it is intended to do — win chess games." Bruce says that his letter was inspired by the recent statements attributed to Boston Globe Chess Editor Harold Dondis who said that computers cheat when they play chess. "If the programs can win their games, against strong human competition, then much can be attributed to the ability of the programmer. I doubt that any program based entirely or even primarily on 'the book' will be a big winner. My guess is that the program which can meet or beat grandmasters will be based on three thrusts; board positions coded into memory; general chess theory and principles; and the look-ahead tree. I'm trying to get into codifying board positions, but I believe that the second thrust, (general chess theory and principles) is more important. Nevertheless, I still maintain that winning is the main thing in computer chess. The following neat and meaty saying may not entirely follow, but it seems appropriate: 'SHOW ME A GOOD LOSER, FELLOWS, AND I'LL SHOW YOU A LOSER!"

Chess Notations

Notations used in this computer-chess department are either Algebraic Notation or "American" Descriptive. For the enlightenment of readers in foreign countries, whose chess symbols differ from ours, the following symbols are commonly used in "American" Descriptive notation:

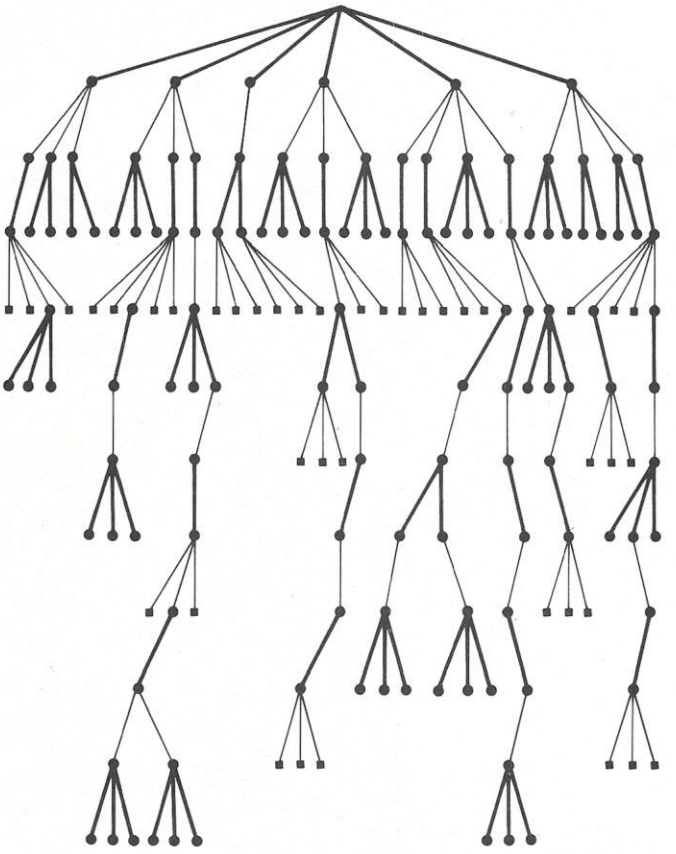
P - Pawn	B - Bishop
R - Rook	Q - Queen
N - Knight	K - King

Answer to Chess Voice problem:
1. QxP+, KxQ; 2. BxR+, and
3. BxQ or 3. RxQ+

Computer Checkers

Checkers Annotations by Richard L. Fortran, Games Editor of American Checker Federation

A Checker Program



. . . This is another extract from Dr. Arthur Samuel's original research in programming a computer to play checkers. The work was done at IBM in 1959. The basic principles used by Dr. Samuel then, are still in use today, although they have been refined and improved. Moving through the "search tree" of a checker or chess program has been compared to an automobile traveling through a thick forest. The auto travels on main Route #62 until it reaches a fork in the road (called nodes in the program) where a choice has to be made. The auto can continue along Route #62 or take new Route #754. The computer doesn't know which is the better road without having some prior information. Therefore it scrambles down Route #754 as fast as it can and discovers that the road ends in a lake. So the car turns around and rushes back to the fork section and continues on Route #62. There is no future on the other road. It goes along in this manner until shortly it reaches another "node", this time a fork with a choice of three roads. As before, the automobile dashes down each of the three roads to see which is the better path. It then returns to the intersection and takes that road which offers the best success. A similar "road search" is done in the checker program and each path is evaluated before making a move. Usually, the program moves along one road for three or four nodes, makes an evaluation, then returns to take the next road to make a second evaluation. When it has searched all avenues of egress it then can decide on the best course to take; that is, the road which will lead the checker program to victory over its opponent. Dr. Samuel's report in the

Classifieds

Rates for advertising in this section: $1 per word. Minimum: 15 words. Allow two months for appearance (usual publication lag).

JOIN:

ICCA (International Computer Chess Association.) $5 annual membership fee includes the ICCA NEWSLETTER with computer-chess news from all over the world. Send U.S. check or international money order to ICCA, Vogelback Computer Center, Northwestern University, Evanston, IL 60201.

8080 CHECKERS

Good for beginners. Program can be set to play at two different levels (four and six move look ahead.) Hardware required is an 8080/Z80 computer with 12K RAM and a memory mapping display such as the SOL, VDM-1 or TRS-80. The cassette tape is $19.50. The North Star diskette is $24.50. For further information, write to TCD, Inc., PO Box 58742, Houston, TX 77058. (Phone: 731-486-0291).

PROGRAM WANTED:

Looking for chess playing program for the Texas Instruments TI-59 Card Programmable Calculator. Would like to buy. Walter Stone, 106th Finance Section, APO, NY 09154.

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NEW PROGRAM FOR SALE:

New computer chess program, "MYCHESS," runs under the Cromemco Z-2 system (CDOS or CP/M). It is written in Z-80 with less than 20K memory and large opening book. Does a full-width two ply search in 5 seconds (4 MHz clock). Price $20 which includes a copy of the source code and the object code on either an 8" or 5" floppy. Write to David Kittinger, 2431 Lyvona Lane, Anchorage, AK 99502.

IBM Journal of Research and Development (Vol. 3, No. 3) explains how this "look-ahead" or "tree-searching" is done.

"The computer plays checkers," writes Dr. Samuel, "by looking ahead a few moves and then evaluating the resulting board positions much as a human player might do. Board positions are stored in the computer's memory by machine 'words', (36 bits per word) four words normally being used to represent any particular board position. The 'look-ahead' is prepared for by computing all possible next moves, starting with a given board position. The indicated moves are then explored in turn by producing new board positions resulting after the move in question. The old board-positions are saved to facilitate a return to the starting point. This process is then repeated, several moves in advance, (see diagram of the 'tree search.') The resulting board positions are then scored in terms of their relative value to the machine.

"The standard method of scoring the board positions or deriving the values, has been in terms of a linear polynomial formula (weighted sums derived from putting different values on different checker positions). One way of looking at the various terms in the formula is to assume that those terms with numerically small coefficients should measure criteria related as intermediary goals to the criteria measured by the larger terms. The achievement of these intermediate goals indicates that the machine is going in the proper direction, where the larger terms will eventually increase. If the program could look for enough ahead, we need only ask: 'Is the machine still in the game?' Because it cannot look this far ahead in the usual situation, we must substitute something else, say the piece ratio, and let the machine continue the look-ahead until one side has gained a piece advantage. But even this is not always possible. So we ask the machine to test to determine if it has gained a positional advantage, etc. Numerical measures of these various properties of the board positions are then added together (each with an appropriate value to define its relative importance) to form the evaluation formula."

Tinsely Agrees

. . . Burke Grandjean, of American Checker Federation, writes that world checker champion, Dr. Marion Tinsely, has agreed to a match against "PAASLOW", Duke University's Computer-Checker program, written by Tom Truscott, et al. Dr. Tinsly was scheduled to be on vacation from his teaching post at Florida A&M during the period from March 12 to May 19 and had declared his willingness to take on Tom Truscott's "checker machine", during that time, in a 20-game-match at 3-move restriction. If the match were to take place, Dr. Tinsely had indicated he would take up residence at a motel in Durham, NC, so that he could be near Duke University's computer for the estimated one-week's duration of the match. In the interim, Dr. Tinsley will be playing Elbert Lowder in a 40-game-match for the world checker championship. The match has been scheduled for the Checker Hall of Fame, Petal, MS, with the tentative dates of May 21-31. The match will inaugurate the opening of the new Hall of Fame and will straddle the dates of the Mississippi Open on May 26-27, in Petal. Meanwhile, the checker world waits with great anticipation the Tinsley-PAASLOW match.

Children's Checkers

. . . Dick Fortman has offered to assist Bill Mahew of the Boston Children's Museum in writing a computer-checker program for the museum's new site. The Children's Museum formerly occupied an old mansion in the area of Boston's well-known Jamaicaway. Now, it has acquired a new building on the Boston waterfront and is planning to move there sometime this summer. In the old location, the museum had a checker program on a PDP-8 computer. They have now upgraded to a PDP-11 and have abandoned the old checker program. Plans for the museum include a checker program for the new computer. Once again visiting children will have a chance to play checkers against the computer. This checker challenge has been, in the past, one of the more popular attractions at the museum and throngs of excited young visitors, it is reported, were crackerjack checker players who easily beat the computer — marveling, all the while, at the fascination of the encounter. Whether or not they will be able to beat a new checker program is a question that may not be answered for a year or so.

Checker Challenge

. . . Fidelity Electronics says that contrary to several reports it has heard, it does not plan to upgrade "Checker Challenger," the way it is upgrading "Chess Challenger". The current checker model, says the company, is directed to the average person not fully acquainted with the expert phase of the game. Therefore, it functions more as a tutorial assist than as a serious checker player. However, as reported here and elsewhere, Checker Challenger is capable of playing an excellent game and has, at times, surprised some good tournament players.

8080 in Action

. . . TCD Inc., PO Box 58742, Houston, TX, 77058, is marketing a checker program that will run on a SOL computer as shipped. It also contains all necessary documentation patches to allow the game to be run on any 8080/Z80 computer with 12K RAM and a memory mapping display. Prices for the cassette is $19.50 and for a North Star diskette, $24.50. A TRS-80 version is scheduled to be released soon. The literature accompanying the program claims that:

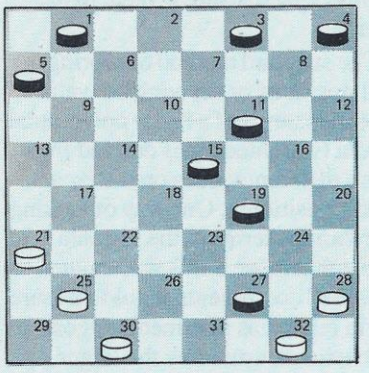
"'8080 Checkers' is capable of playing a challenging game of checkers as well as providing tutorial assists for the beginner. The program can be set to play at two different levels of difficulty (four and six move look-ahead) for both the beginner and the advanced player. At level four the program will respond in less than four seconds and at level six the program will typically respond in less than 60 seconds and rarely more than 120 second. An interesting feature is that it randomly selects between equal moves; and players who have beaten it once find they cannot duplicate the feat. The checker board is imaged on the display using full height of the screen and 3/4ths the width, thus

allowing play without a separate checker board."

A recent letter received from William T. Block, Vice President of TCD, Inc., says: "We invited Noel Boland over to our place to try his luck against 8080. Noel is a rated master-level checker player and lives at 1448 Pearson St., Houston, TX 77023. Although Noel, understandably, dominated all three games that were played, we both agreed that the average checker player would consider 8080 to be a challenging opponent. Rated players, of course, might be disappointed. However, plans are to upgrade 8080 so that even the better players will find the program a challenge. And at $19.50 it's a better buy than Star Trek or Tic-Tac-Toe! We documented the first game played and the time column represents the amazing response time of 8080." That game is reproduced here. Dick Fortman, unable to discuss the program through his own participation, analyzes the play of the program against Boland. "The game of 8080 checkers versus Boland is, unfortunately, a poor selection. It is probably not the best game that 8080 can play. It can be seen that the computer went into an unfortuante losing line on only its third move! Regarding the use of the rating of 'Master' it might prove interesting to explain our rating systems. Under current ACF National Tournament set-ups, there are three classes of players; Master, Major and Minor. At Murfreesboro last summer, 32 entered in the Master class, 79 in Major and the remaining 52 in Minor. This is *self-classification*. Anyone may enter the Masters by paying a higher entry fee. The large majority of players recognize their own playing strength and enter accordingly — if at State champ level. I find the 8080 checker game interesting in its response time. It plays very fast — practically Blitz! Hopefully, it will come up with some better games."

MOVE	BLACK NOEL BOLAND	WHITE 8080 CHECKERS	TIME (Seconds)
1	11-15	22-18	6
2	15-22	26-17-A	8
3	8-11	17-14-B	17
4	10-17	21-14	1
5	9-18	23-14	13
6	6-9-C	31-26	13
7	9-18	25-21-D	38
8	2-6	24-20	50
9	6-9	29-25	38
10	7-10	26-23	27
11	10-15	23-14	2
12	9-18	20-16	14
13	12-19	27-23	20
14	18-27	32-7-E	1
15	3-10	25-22	8
16	1-6	21-17	6
17	6-9	28-24	8

Black-NOEL BOLAND
White-8080 CHECKERS



Position at 14th move. A thrilling moment in the life of any checker player as White is about to make a triple jump from 32 to 7!

18	4-8	17-13	12
19	8-12	13-6	2
20	15-18	22-15	1
21	10-28	6-2	4
22	5-9	2-7	5
23	12-16	7-11	9
24	16-19	11-8	9
25	19-23	8-12	9
26	28-32	12-16	9
27	32-27	16-20	17
28	23-26	30-23	1
29	27-18	RESIGNS	

Annotations by Dick Fortman

A. One of the basic concepts of *opening* play in both chess and checkers is *central control*. Why the present day computers are programmed to take these side exchanges (also 27-20 instead of 28-19) escapes me. This move of 26-17 now results in a badly crammed White game. The correct move at this point would have been 25-18.

B. With a human playing White, this could only be classified as a "beginner's mistake"! Now White must lose this piece as well as the game itself. He has no positional edge to justify playing a piece short. Here, *23-18 is the only move to sustain a White draw.

C. Correct. Black has three pieces to attack this man; whereas White has just two.

D. White may as well concede at this point! The alternate move of 26-24 is not much better. After 1-6, 23-14, 6-9, 30-26, 9-18, 26-23, 2-6, (the "Third Man Theme") 23-14, 6-9 and Black wins.

E. The brightest moment in 8080's struggle. It took the computer program only one second to find this triple jump! But it did not save him from his ultimate execution.

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An Invoicing Program

BY DAVID A.L.A. WHITEHEAD

Billing is no bother with this business routine.....

This program produces bills for electricity. However, with a small amount of transposing, the program can be used for restaurants, grocers or drug stores. I have a friend in London who uses a similar program to produce bills and update accounts in his restaurant. (He serves the best rabbit stew you've ever tasted, by the way.)

Rather than writing a long explanatory text to the program, I've included REM statements. In my opinion, this is an easier way to follow the progress of a program and takes up less space, overall.

The program uses "Read", "Data" and "String$" as well as "Tab" function to produce invoices or bills or credit notes. Data is read from a datalist for a given number of accounts (variable "B"), checks to see if the data is valid and then produces an invoice for that account. There are a few points to consider:

1. The "String$" function in line 160 is used to ring a bell in the terminal or micro. If a bell is not available then another character will have to be used. The string$ operates like this: String$ (A,B) will print a string of A lots of the character of ASCII value B. The string

function could be used to print the lines needed instead of the instructions in lines 261 — 263, 300 — 302, 331 — 333 and 381 — 383. (Note that the ASCII values of OMD * are 95 and 42.)

2. The lines printed in output are 40 spaces long. This may have to be shortened or increased depending on your particular machine.

3. Lines 390 — 395 produce a lag in output which may be necessary if output is from a V.D.U. Otherwise delete these lines.

Using a data list is the quickest way to process the data. However, if this program is going to be adapted for use in a restaurant then an "Input" statement would be more practical. The costs, products eaten, etc., would then be entered and a bill produced. (This is coming close to word processing as the basic bill format would be on the machine permanently and the costs, etc., added when a customer leaves).

Other businesses would require different Inputs. If this is going to be used by a grocer then file storage would be most practical for bill and credit note production.

The REM statements can be deleted from the program when it is compiled as these take up memory space. When these statements are deleted the program is reduced to about 500 bytes. □

Sample Output

```
READY
RUN

PROGRAM TO PRINT INVOICES
THIS IS FOR ELECTRICITY INVOICES


TRELICE CITY ELECTRICITY GENERATING BOARD

- - - - - - - - - - - - - - - - - - - - - - - - -

NAME        ACCOUNT        UNITS
....        NUMBER         USED

- - - - - - - - - - - - - - - - - - - - - - - - -

SMITH       506            177

                                CHARGES
- - - - - - - - - - - - - - - - - - - - - - - - -

100 UNITS AT 2 DOLLARS PER UNIT = 200 DOLLARS
77 UNITS AT 1.5 DOLLARS PER UNIT = 115.5 DOLLARS
STANDING CHARGE = 1.75 DOLLARS

TOTAL CHARGE = 317.25 DOLLARS
```

Program Listing

```
10    PRINT "PROGRAM TO PRINT INVOICES"
20    PRINT "THIS IS FOR ELECTRICITY INVOICES"
25    REM COULD BE USED FOR GAS, GROCERIES, RESTAU-
      RANTS, ETC.
30    C1 = 2.00
35    REM COST FOR FIRST 100 UNITS IN $
40    C2 = 1.50
45    REM COST FOR FURTHER UNITS IN $
50    C3 = 1.75
55    REM COST OF STANDING CHARGE
60    READ B
65    REM NUMBER OF ACCOUNTS
70    FOR D = 1 TO B
80    READ A,D1,D2,A$
85    REM ACCOUNT NUMBER, METER READINGS, NAME OF
      ACCOUNT HOLDER.
90    IF A<0 THEN 140
100   IF A>10000 THEN 140
110   IF D1>D2 THEN 140
120   IF (D2-D1) 10000 THEN 140
125   REM ABOVE SECTION CHECKS ACCOUNT NUMBER AND
      METER READINGS
130   GO TO 170
140   PRINT
150   PRINT "ACCOUNT NUMBER" A "APPEARS TO BE IN
      ERROR PLEASE CHECK DATA"
160   PRINT STRING$(20,7): GO TO 250
165   REM PRINTS ERROR MESSAGE AND RINGS BELL
      (STRING$(20,7)) 20 TIMES TO ATTRACT ATTENTION
170   E = D2 - D1
175   REM NUMBER OF UNITS
180   E1 = E - 100
185   REM NUMBER OF ACCOUNTS AT LOWER RATE
190   IF E1>0 THEN 210
195   REM NO ACCOUNTS AT LOWER RATE
200   E1 = 0
210   E2 = E - E1
215   REM NO OF UNITS AT HIGHER RATE
220   F = (C1*E2)/100
225   REM COST OF HIGHER RATE UNITS
230   F1 = ((2*E1)/100
235   REM COST OF LOWER RATE UNITS
240   T = F + F1 + C3
245   REM TOTAL CHARGE
250   PRINT:PRINT:PRINT
255   PRINT "TRELICE CITY ELECTRICITY GENERATING
      BOARD"
260   PRINT
261   FOR Y = 1 TO 30
262   PRINT "-";
263   NEXT Y
264   REM PRINTS A LINE OF 30 "-"S
270   PRINT TAB(2);"NAME";TAB(9)"ACCOUNT";TAB(18)
      "UNITS"
280   PRINT TAB(2);"....";TAB(9)"NUMBER";TAB(18)"USED."
290   PRINT
300   FOR Y = 1 TO 30
332   PRINT "-";
302   NEXT Y
310   PRINT A$;TAB(12);A;TAB(20);E
320   PRINT
330   PRINT TAB(14);"CHARGES"
331   FOR Y = 1 TO 30
301   PRINT "-";
333   NEXT Y
340   PRINT E2"UNITS AT"C1"DOLLARS PER UNIT ="
      F"DOLLARS"
350   PRINT E1"UNITS AT"C2"DOLLARS PER UNIT ="
      F1"DOLLARS"
360   PRINT TAB(3)"STANDING CHARGE = "C3"DOLLARS"
370   PRINT
380   PRINT "TOTAL CHARGE ="T"DOLLARS"
381   FOR X = 1 TO 30
382   PRINT "*";
383   NEXT X
384   REM TEAR LINE
390   FOR Z = 1 TO 2000
395   NEXT Z
396   PRINT:PRINT
400   NEXT D
410   DATA 3,506,24,201,SMITH
420   DATA 1001,46,72,JONES
430   DATA 40,82,156,PETERS
440   END.
```


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CIRCLE 20

COMPUTER BRIDGE

BY THOMAS A. THROOP

This article considers the first computer-bridge playing program, developed for the home consumer market, of which I am aware. It is a program created by George Duisman, of Petaluma, CA, with versions available for Commodore's PET, Radio Shack's TRS-80, and the Apple. The program defends (while you play as declarer) the contract of your choice after you have seen your hand and your partner's. The concept introduces an entertaining way of practicing the declarer's play. After playing a given deal, you can recall the same deal on the computer so that you can try a different line of play.

Another idea, which is a lot of fun, is to compete with one or more persons in the play of the deal by comparing your play with that of your rival(s). As in duplicate bridge, you will be trying to determine who can play the same cards the best. In fact, George Duisman, an expert bridge player and programmer, suggested that he and I compare our declarer play, and the associated play, by his progam on several hands. Those readers who own or have access to one of the above mentioned personal computers are urged to try their skill against the program and compare their play to that of George and myself. The deals to play are "deals 1,5,7,11, and 15 of set 3.65." By asking for these specific deals the pseudo random number generator in the program will generate the proper deals.

I found deals 1 and 15 to be the most fascinating from the above group. On deal 1, your cards (South) and your partner's (North) are as follows:

NORTH
(Dummy)
♠ AKQ1042
♥ A1094
♦ A5
♣ 7

SOUTH
(You)
♠ J873
♥ KJ8
♦ J9
♣ A953

There is a good play for 6 or even 7 spades, although 6 is as much as you would reach in a good bidding sequence at the table. North would usually end up being the declarer, but without switching the hands around, which can be done by the Duisman program. The N-S cards are as shown.

		Computer West	North (Dummy)	Computer East	South (You)
Trick	1	2D	**AD**	3D	9D
	2	2C	7C	4C	**AC**
	3	**8C**	**2S**	6C	3C
	4	6S	10S	5S	**JS**
	5	10C	**QS**	2H	5C
	6	4D	**KS**	9S	3S
	7	8D	5D	**QD?**	JD
	8	10D	**4S**	6D	8H
	9	3H	4H	5H	**KH**
	10	KD	**AH**	6H	JH
	11	JC	9H	7H	**7S**
	12	QC	**AS**	7D	9C
	13	KC	10H	QH	**8S**

I chose to play 6 spades. The opening lead by the computer as West is the 2 of diamonds. (If North were the declarer, it turns out that the computer's opening-lead algorithm would result in a similar low diamond lead from East.) As you can see, to successfully make 6 (or 7) spades you must not lose a trick to the queen of hearts. How would you plan to resolve that problem? Go off to your personal computer, please, before reading further.

Your first hope is that the 9 of spades is a singleton in West's or East's hand. After winning the first trick with the ace of diamonds, you play to your ace of clubs. Next, ruff a club low, then lead dummy's 10 of spades (preserving the 4 for another entry to your hand) to your jack. Ruff a second club with the spade queen, and return to your hand by leading dummy's 4 of spades to your 8. Ruff your last club with dummy's spade king, then lead the 5 of diamonds from dummy. East or West will now be end-played. Whoever wins will be forced to give you a sluff and ruff with a diamond or club lead, because you have neither suit in your hand or the dummy. A heart lead will solve your problem of finding the queen of hearts.

Thus, I played the N-S cards for the first four tricks, while the computer played the E-W cards, as shown in the tableau below:

The 9 of spades does not drop as a singleton at trick 4. The location of the queen of hearts is now a guess, unless the computer makes a mistake. After ruffing the 5 of clubs with the spade queen, (on which East shows out and discards the 2 of hearts,) I cashed dummy's king of spades, picking up East's 9. After this trick West is known to have started with one spade and six clubs, revealing his original holding of six cards in the red suits. East is known to have started with two spades and two clubs; therefore he originally had nine cards in the red suits.

Thus, the odds favor East holding the queen of hearts. However, if you assume that an overtrick is not important, why not give the computer a chance to make a mistake! I led the 5 of diamonds from dummy. If East holds the diamond king and the program does not "know" the location of the diamond queen when playing as East, East may play the king and be end-played. To my surprise, East played the **queen** of diamonds for reasons unknown! West was

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CIRCLE 21

not up to the master play (I couldn't really expect him to be) of overtaking the queen with his king thus rescuing East from the end-play. Then West could safely lead a club. After taking his diamond queen trick, East chooses to lead the 6 of diamonds, permitting a sluff and ruff. This lead made it unnecessary to finesse for the queen of hearts. The tableu shows the play of the last six tricks. The results — 6 spades successfully made. The entire deal is shown below:

NORTH
(Dummy)
♠ AKQ1042
♥ A1094
♦ A5
♣ 7

COMPUTER WEST
♠ 6
♥ 3
♦ K10842
♣ KQJ1082

COMPUTER EAST
♠ 95
♥ Q7652
♦ Q763
♣ 64

SOUTH
(You)
♠ J873
♥ KJ8
♦ J9
♣ A953

The computer's significant defensive plays have been discussed except for the opening lead. A more normal opening lead would have been the king of clubs or the singleton heart. On this particular deal, of course, the latter would solve all of declarer's problems.

When George Duisman played the deal, he chose to play it at 7 spades. Now you cannot afford to lose a single trick, so you must simply finesse East or West for the heart queen. George, for slightly different reasons, played the deal the same way I did for the first six tricks. Now, knowing as did I, that East originally held nine red cards to West's six, he planned to lead the 4 of hearts to finesse East. Guess what? By mistake he typed into the keybord "S4" rather than "H4". His program most unforgiving, promptly accepted this play, and discarded the 6 of diamonds. There was still hope (assuming East held the queen of hearts), although George was afraid his program would be too smart. Now in his hand, having been forced to overtake the spade 4, he ruffed his 9 of clubs with the spade ace. Then he led the 10 of hearts, hoping his program would blunder as East and cover with his queen. No such luck! East smoothly played the heart 5!

George played the jack of hearts, which held the trick. Now, if East originally held only three hearts, rather than four or five, he would still make his grand slam. Alas, upon cashing the king of hearts, the bad news is revealed. Result — down 1 and the first deal to Tom.

On deal 5 I elected to play 3 no-trump, making five for a higher score than George, who played 4 hearts making four. Thus, this deal also to Tom. On deal 7, which is also a fascinating deal, we both played 3 no-trump making five. See if you can make five. There is a squeeze or the computer may slip. Send me any results you think are interesting. On deal 11 George and I both played and made 4 spades.

Now for the last deal, deal 15. Your cards and your partner's are as follows:

NORTH
(Dummy)
♠ 7
♥ KQ9765
♦ AJ42
♣ Q4

SOUTH
(You)
♠ QJ1083
♥ A32
♦ K
♣ J982

George and I both played 4 hearts. Off to your computer, dear bridge addict, before you read further.

My play and the computer's defense is shown in the tableau below:

		Computer West	North (Dummy)	Computer East	South (You)
Trick	1	5C	4C	**AC**	2C
	2	**AS**	7S	2S	QS
	3	4S	**5H**	5S	3S
	4	4H	6H	3C	**AH**
	5	3D	2D	5D	**KD**
	6	**KC**	QC	6C	8C
	7	7D	**JD**	6D	8S
	8	8D	4D	10D	**2H**
	9	9D	**7H**	7C	JC
	10	QD	AD	6S	**3H**
	11	8H?	**9H**	9S	JS
	12	10H	**KH**	10C	9C
	13	JH	**QH**	KS	10S

At trick four I discovered the 4-0 trump split, which should result in down 1. However, knowing that East was "human", after all, I saw a chance of creating a situation which I thought might be too difficult for East. All that was required was for West to have started with four or more diamonds.

I cashed the king of diamonds, then led a club. West won the king of clubs and led the 7 of diamonds. I played the jack hoping to learn who held the queen, East played low, presumably meaning he did not have the queen. Now a diamond ruff with East discarding the 10 of diamonds. Apparently this was his last diamond, which places West as originally holding two spades, four hearts, five diamonds, and three clubs. Now trick 9 is the critical moment for West. If you lead the 3 of hearts, will he be good enough to put up the 10 of hearts rather than playing the 8 by some "second-hand-low algorithm"? I decided that, even though I thought West would go wrong (I was right), I could give West a harder problem. I led the good jack of clubs! Would West make the mistake of ruffing low rather than coming up with the heart? Somewhat to my surprise, West did neither. He postponed the problem by simply discarding the 9 of dia-

monds! Now, caution is required. If you let the jack win the trick, you must then lead the 3 of hearts with the hope that West will misplay as mentioned. However, to again give him a more difficult problem, I ruffed my good jack of clubs in the dummy! I returned to my hand by ruffing dummy's good ace of diamonds! On this, West had to follow with his queen. Now, at trick 11, on the lead of the spade queen or any other card, West must decide which card to use for ruffing. West, still learning this game, ruffed low as I had hoped. Thus, I made 4 hearts. George also made 4 when West failed to put up the ten or jack of hearts on a heart lead from South sometime during the play of the hand. The entire deal is shown below:

The opening lead by West, as you can see, was a bit unusual. Better choices are the ace of spades, the 7 of diamonds, or the king of clubs.

The score of my friendly contest with George was thus two deals won by me.

NORTH
(Dummy)
♠ 7
♥ KQ9765
♦ AJ42
♣ Q4

COMPUTER
WEST
♠ A4
♥ J1084
♦ Q9873
♣ K5

COMPUTER
EAST
♠ K9652
♥ —
♦ 1065
♣ A10763

SOUTH
(You)
♠ QJ1083
♥ A32
♦ K
♣ J982

The other three deals resulted in ties. I've promised George a rematch next month. The deals we are going to play are "deals 17 and 18, as well as 21, 25 and 28 of the same set 3.65." While waiting for the results of our next match, see how expertly you can play these deals, as N-S.

In my next report I shall include some comments received by readers with any appropriate replies. Until then, happy bridge playing!

The Duisman "Computer Bridge Program" is available from Personal Software, Inc., PO Box 136, Cambridge, MA 02138. Cost of the cassette is $14.95 and can be ordered in one of three forms: APPLE II (16K); PET (8K); TRS-80 Level II (16K). It can also be ordered by phone (Master Charge or Visa only) by calling toll free 800-325-6400. It is also available in 300 computer stores around the country and if you don't know of a computer store near you, call 617-783-0694 to find the closest location of one to your abode.

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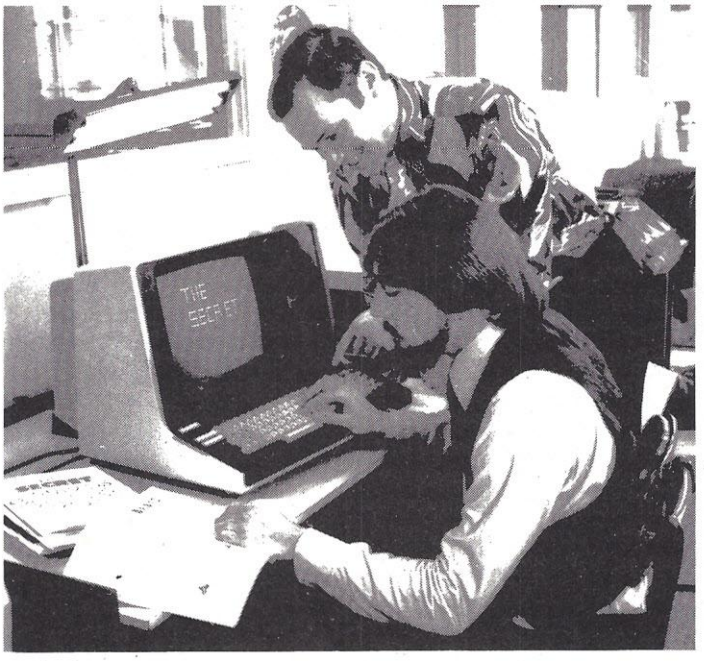
CIRCLE 22

Revealing Approach to a Secret Guide

Secret Guide To Computers, by Russ Walter (author and publisher); 92 St. Botolph St., Boston, MA 02116; six-volume set; $16.25; paperback.

One author who has a lot of fun writing a book, is Russ Walter, who recently finished the last of a six-part series called "Secret Guide to Computers". Walter's books are bulging with information and you will spend an enjoyable session with them.

Russ Walter is the only author we know who invites readers to talk back to him. He makes it easy by publishing his home phone number and urges readers to call him whenever they encounter a problem they can't solve. What reader has not yearned for the chance to call an author and ask him what the devil he meant by a certain phrase? Russ gives you that chance. In fact, his approach to text-writing sets a new style that other authors might do well to follow.



This six paperback volumes of the "Secret Guide" offer, in the first four parts; "courses" in BASIC, Applications, Languages and Systems. The 5th and 6th volumes are "commentaries" which anticipate any question that might be raised by a reader. The commentaries also clarify all passages in the books that might seem hazy.

The "Secret Guide" is one of the most readable texts on computers that has appeared to date. Russ makes every effort to expunge all resemblances to classroom formality (a style with which he is familiar, as he is a teacher of mathematics and computer science). Instead, he has produced a set of books that is readable, instructive and downright entertaining.

In general, the first four books of this set explain computers in all their intricacies, compare functions and relationships, and are fairly simple to understand. Then, in the commentaries, the author, acting like a concerned professor hovering over one of his puzzled students, leafs through every page of his books and explains those parts that might prove troublesome. No longer is it a big deal to write about computers, as witness the various publishers who are currently turning out endless streams of such tomes. But it *is* a big deal when someone like Walter writes something that is easy to read. If more college texts were written in the Russ Walter style, then more college students would undoubtedly reach their commencement day. Nothing is more frustrating (or frightening) to a college student than getting stuck on one page of a text while the rest of the class rushes ahead, leaving him far behind.

The six books that make up this set are recommended to anyone who wants an in-depth review of computers and, in addition, wants the author by his side to answer any question that might pop up. Russ sums up his literary goal in the preface to the "Commentaries".

"Why was this book born?" he asks. "Well, trying to program the computer makes a fascinating horror story. Lights blink, paper spits out at you and (surprise!) the computer comes up with the wrong answers. You'll tear your hair out trying to figure out why. The purpose of this book, then, is to let you keep the few hairs you still have left and to help prevent permanent baldness."

In Book #1 of his series, the author makes the following statements, (designed to automatically endear him to his readers):

"Anytime you have any question about computers, pick up your phone and give me a buzz. You'll get *free* advice, no matter how peculiar your question. Call day or night — 24 hours! This free consulting service has saved my readers many kilohours and kilobucks. Furthermore, I can tutor you for six weeks, 7 days per week, 15 hours a day, and, in addition, give you unlimited use of a maxicomputer, minicomputer or microcomputer, and award you university credits toward a master's degree. The total tuition is only around $300. I offer shorter, less expensive courses, too. Several readers are making money by having me teach courses in their own towns. If that idea interests you, give me a buzz. Say whether you want me to teach in English or in French. Many of my students have become heads of computer centers, programming entrepreneurs, etc. If I can do anything to help you in *your* computer career, let me know."

Individual volumes may be purchased separately at these prices: Vol. 1 ("BASIC"), $2.75; Vol. 2 ("Applications"), $2.50; Vol. 3 ("Languages"), $3.50; Vol. 4 ("Systems"), $2.75; Vol. C1 ("Hassles in BASIC"), $2.50; Vol. C2 ("Answers to Tough Questions"), $2.25. There's no extra charge for postage. — *By Harry Shershow*

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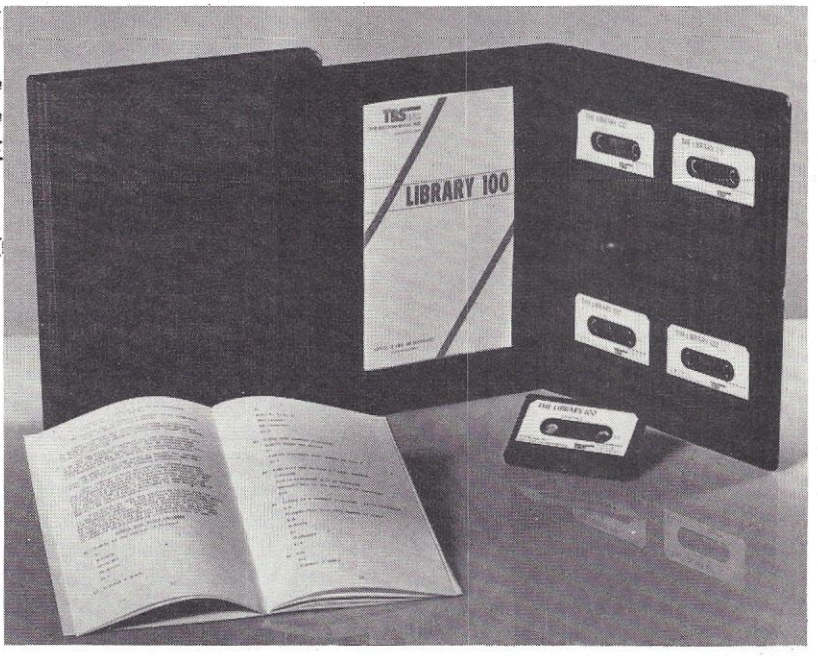

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CIRCLE 23

Michael Shrayer's Electric Pencil

BY JOSEPH A. GREENLEAF

One of the latest software gadgets for the TRS-80 is Michael Shrayer's Electric Pencil word processor. Actually, for anyone who spends much time writing, the Electric Pencil is much more than a toy.

One of the biggest problems with writing is the mechanics of the typewriter — putting in page after page of paper, collating carbons, aligning the paper, making sure you don't type for five or ten minutes after you've reached the end of your paper while the sheet has long since fallen on the floor. . .

With the Electric Pencil, you type what you wish on your CRT screen, following a blinking block of light. All editing and corrections are made electronically, without the need for gallons of white-out paint, used with typewriters.

When the document is completed, you turn on the printer for your TRS-80, and instruct it to print out the number of copies needed. Voila! The printer cannot spell any better than you can. (This bringgs out the old stoary that if u cant spel gud, a mileon dolar computor cant ether).

I bought the first version of the TRS-80 Electric Pencil (which isn't really a pencil — or even a pen; its a cassette tape). Everything I printed came out double spaced, or with no spaces at all. The Electric Pencil has been around in other versions for a long time, and has worked well. However, the TRS-80, like many other computers, doesn't give an automatic line feed on a carriage return (or ENTER). The Centronics 779 printer, which is identical to the Radio Shack line printer, must have a jumper wire moved from one point to another on the PC board to give these automatic line feeds. Radio Shack has them delivered that way; if you buy a 779 elsewhere, you must tell your dealer to move the jumper, or move it yourself. The Electric Pencil (E/P) didn't allow for the fact that Radio Shack delivers its printers as giving auto line feeds, so E/P gave its own line feed on a carriage return, by software, for double spacing. Good, but not great.

Apparently this problem was observed, and the company exchanged the cassettes. The new cassette works splendidly.

The E/P on cassette costs $100, including the manual. After having used the E/P daily since I received it, I think it's well worth the price.

You need at least 16K and either Level-I or Level-II to use the E/P. Memory is power, and if you're going to do much writing you'll want to obtain more memory. Since my system is 48K, I've been able to write some lengthy ditties without running out of memory too often.

Both levels are on the same side of the cassette. (Incidentally, your first official act should be to remove the write/protect tabs on the cassette, since the producers didn't. At a hundred silver dollars, you don't want to record the Top Ten over your program.)

Written in machine language, the program, at least in Level-II, is the usual pain in the neck to run. Machine language tapes, at least in my system, have critical volume settings. The manual says to start at "6" on the CTR-41 recorder. It took quite some time, but I finally got it to run at "7". You should mark the proper level on your volume control. The tone should be "high".

The system command is PENCIL and takes a few minutes to load. The first thing displayed is "LOWER CASE KIT INSTALLED? (Y/N)". The manual contains instructions for adding a three-buck memory chip and a toggle switch,

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• 1978 Michael Shrayer

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Electric Pencil I is still available for non CP/M users:

Vers	Video	Printer	Cassette	Disk Drive	Price	NOW!
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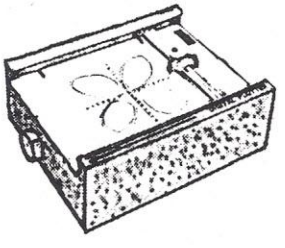

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CIRCLE 24

thus getting upper and lower case. Of course, if your printer doesn't print both you don't need them. Neither the Radio Shack line printer nor its twin, the Centronics 779, have lower case. You type N without (ENTER) and you see: "THE ELECTRIC PENCIL (C) 1979 BY MICHAEL SHRAYER". Typing any character gives you the blinking cursor in the upper right corner of the screen.

If you'd like titles on each page, you now type a dollar sign and then the title. On printing, simply make sure the cursor is on top of the $ and the computer will print the title on each page, plus consecutive page numbers in the upper right of each page, up to 255. To get page numbers only, just have a dollar sign at the beginning of your work. You can tell the computer to start at a number other than "1", but "1" is the default value — it will use this and other default values unless you tell it otherwise.

You have full scrolling with the E/P, and either arrows or other commands can be used to move the cursor up, down, around . . . . The cursor itself is "transparent", so, if you move it over a character, you can still read the character.

Commands are typed as upper case; that is, you shift, then type the command, such as D which deletes a character with each impression, or B which moves the cursor to the begining of the text. These two can be easily remembered, since they begin with the first character of their functions, but others are a little more obscure. They were presumably chosen for their position on the keyboard, but that seems a bit unlikely. So, you have V for string search, T for erasing to the end of the line, and others which must simply be learned or referred to in the manual.

If you review the list of commands and functions, you will see that you can delete or insert characters, delete or insert lines, erase to the end of a line, repeat functions, scroll and string search.

When you type and reach the right side of the screen, the computer will move the last word you are typing down to the next line, as a whole word, without being hyphenated or otherwise broken. Consequently, you don't have to worry about line numbers or the length of your sentences. To terminate a paragraph, or "record", you hit ENTER, which is indicated on the screen (but not printed) as a back-arrow. The cursor jumps to the next blank line. To insert a blank line (or many of them), hit an ENTER for each blank line desired. I am a touch-typist, and for years as a radio operator in the Coast Guard I typed for long, long hours. This earned me a tin ear and good typing skills. So, when my nimble fingers dash across the keyboard, and the E/P "rolls over" to the next line, my high typing speed often causes the E/P to drop a character in the word that is brought down. I estimate this occurs at speeds of 60 wpm and above. It's irritating, and an obvious bug with the program. I can live with it, though; and if you type less than 60 wpm, you'll never see it.

One of the nicest features of the E/P is the string search, which is called a "global search" in some other sytems.

By typing V (that is, "shift —V"), you make everything disappear from the screen (don't worry, it's in there someplace!) and "SEARCH STRING?" with a cursor is displayed. Type in a word you wish to search for and then ENTER; the computer will search everything after the present cursor location for that string. If you had the cursor at the end of the text and search for, say, "JOE", the screen would display "CAN NOT LOCATE 'JOE'". If "JOE" was somewhere in the text, you could type B, which would move the cursor to the beginning of the text; on repeating the search, the cursor would move to the beginning of the first line which contains "JOE" If it appears more than once, you can continue the search for the same word by typing C. The cursor will move to each successive line containing "JOE".

The Electric Pencil stands up very well to the expensive competition, for a fraction of the price tag.

Added wonders: If you want to replace a string (word or series of words), type V again. Instead of just typing "JOE" type JOE/BOB/9999. On ENTER, the computer will find each occurence of "JOE" and replace it with "BOB". The 9999 is simply a high enough number to insure that each occurence will replaced. If you want to simply replace the word a certain number of times, say 4, the format would be JOE/BOB/4. This function can be very useful for repetitive work. If, for instance, you were called upon to type "Radio Shack" time after time, you could simply type the initial "RS" or some other code for the word. After finishing, command the computer to replace "RS" with "Radio Shack" by string search.

One other advantageous technique is moving blocks of text — which could be words or paragraphs. The beginning and end of the block is marked with a SHIFT Arrow, and moved with commands like U (delete block) and H (insert block). The commands move the block to wherever the cursor is, very helpful in rearranging the text or adding new material.

The controls and parameters are displayed by typing K. You see a list of sub-system commands, such as "TAPE READER", "TAPE WRITER", "TAPE VERIFY", "RGHT JUSTIFY" and "CLER SYSTEM".

With the sub-commands, you can save a text on cassette, verify it and play it back. (After, of course, discovering the proper volume on the recorder; mine is "5" for tape functions.) You can also set the spacing, the width of the lines, the page length (legal, standard, labels and so forth), the left margin, page number and justification, flush or ragged right edge. You can also count the number of words and records (paragraphs) occuring after the cursor. Some values, such as the length of an 8½" x 11" page and the width of the TRS-80 video display, are default values and needn't be set, although you can change what you want.

Having personally used some very, very expensive word processing equipment and some even more expensive computer-operated typesetting equipment, my feeling is that the Electric Pencil stands up very well to the competition, for a fraction of the price tag, and is a great addition to the TRS-80 system. It takes a big step toward allowing a person or business to really use the TRS-80 for practical applications.

With typing skills and the Electric Pencil, you can often avoid the secretarial step in producing printed output, cutting time from idea to production. □

How to write for Personal Computing

You've written the programs we want to publish. You – the *Personal Computing* readers – are using your computers in businesses, homes, offices and schools. Other readers, just as software-hungry as you, are eager to try out your programs, your applications and your techniques. So why not share what you've done by submitting an article to *PC?*

It's easier than you might think. Remember: we're more interested in practical programs and useful applications than in fancy prose. And our editorial staff stands ready to help with any problems you encounter in writing your article; just give us a call at (617) 232-5470.

Here are some handy guidelines to help you get you started.

First, decide what kind of article you want to write. Do you have a *business program* that will help an executive, salesman, doctor, lawyer or shopkeeper function more efficiently? Think about how businesses can benefit from microcomputers – not only in the obvious areas of inventory, accounting and payroll, but in all departments and levels right up to the president's desk. Financial and marketing analysis, time management, planning, material handling, product design and cost accounting are areas ripe for creative programming.

How do you use your computer for *home and personal applications* in your living room, kitchen, study or den? Again, think beyond the obvious areas of checkbook balancing and budgeting (though these areas are far from exhausted) to other applications. Hobbies, home management, house-hold inventory, gardening and landscaping, personal income and expense analysis, personal mailing lists and work processing are just a few ideas to spark your imagination.

What *education programs* have you written for children, adults, professionals, businessmen and teachers? Computers can not only teach children basic subjects such as spelling, math, geography, economics, civics, grammar, literature and science, but can help adults review or sharpen skills in these areas as well. How else can computers function in or out of the classroom to aid learning? To help teachers and administrators?

Are you proficient in some programming technique or special computer area you could explain in a *tutorial article*? How do you save time, money, computer memory or frustration when programming or using your computer? Others can benefit from the same techniques you use.

Computer games, history, humor and fiction are other areas rich in article and story ideas.

Your second step is to write the text of the article. Remember, readers aren't familiar with your program. So explain in detail what the program does and how it does it. Include here the overall structure of your program as well as any special algorithms or routines you've used. Give suggestions for modifying or expanding the program for other applications, other businesses or other situations.

Third, prepare your supporting documentation. Include at least a program listing and one or two sample runs, and add program notes to explain any special commands used or other special features of your program. Use charts, diagrams, figures and photos if they help explain your program and its use.

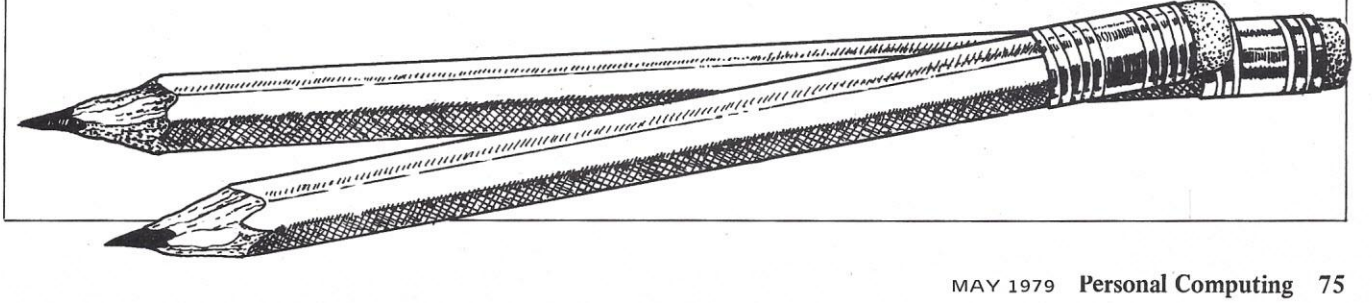
Finally, mail your manuscript. Address it to Editor, Personal Computing Magazine, 1050 Commonwealth Ave., Boston, MA 02215.

A few suggestions: All submissions should be original, typed (*not* all CAPS), double-spaced and neat. Please include your name and address on the first page of the article and enclose a self-addressed, stamped envelope for return of material.

Since we photograph program listings and sample runs exactly as you send them to us for publication in the magazine, please be sure you use a fresh ribbon for computer printouts. If you don't have a printer, you can type your listings single spaced; but again, be sure you use a new ribbon. (If your program relies heavily on graphics, you can photograph sample runs from your CRT. But take care to avoid distortion due to the curve of the screen.)

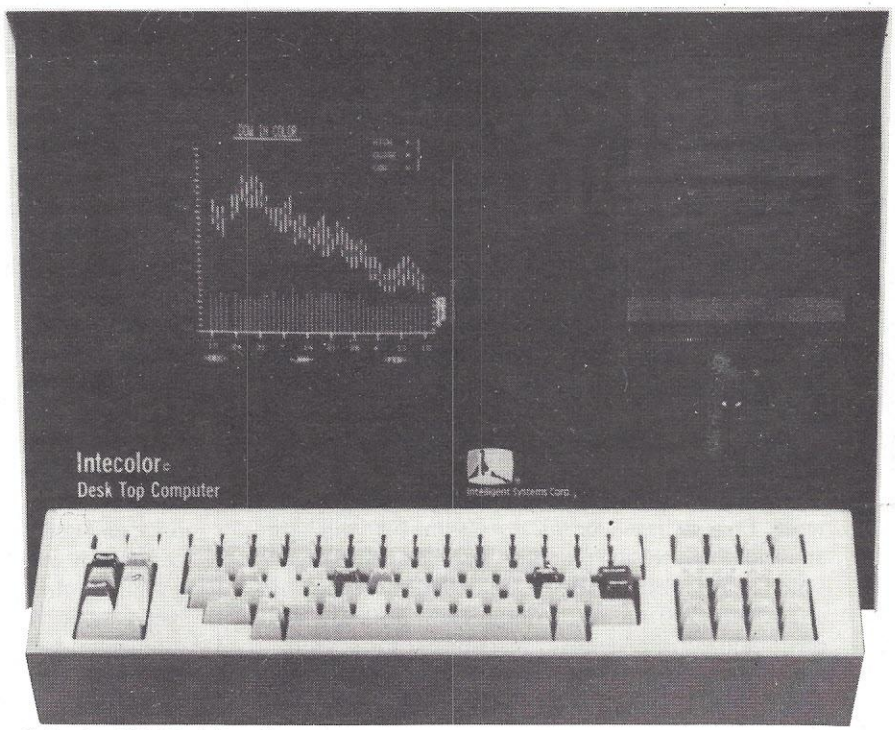
Feel free to call us if you have any questions or want to discuss specific ideas. We can give you feedback and suggest appropriate slants and approaches.

We're always looking for fresh, original ideas. While these guidelines will help you in preparing material for *Personal Computing*, don't assume we don't want your idea just because it's not mentioned here. Let us and our readers know what *you're* doing with your computer.



Intelligent Systems Color Graphic Computers

Intelligent Systems Corporation of Atlanta, Georgia, introduced a line of microcomputer systems which feature color graphics. Of the six systems, two are specifically designed for business applications and one has Arabic/Farsi input/output.



Intecolor 8031 Desk Top Computer

Intecolor 8031 Desk Top Microcomputer

The Intecolor 8031 Desk Top Computer has a 13" screen and built-in, single mini-disk drive with 80K bytes of storage capacity. Built around the 8080A CPU, the 8031 contains Disk BASIC 8001 language which includes file handling capabilities, a graphics package with graphics plot hardware, expanded graphics software and eight colors foreground and background. Plotting is done on a 160 × 192 grid area with a 48 line × 80 characters/line format.

The system has an RS-232C for interfacing and 31 internal I/O ports. Two extra RS-232C ports and a 24-bit bi-directional parallel I/O port are also available.

8031 comes equipped with 27K memory, expandable to 64K. 16K of RAM is included, with all system software in ROM.

The separate keyboard contains standard ASCII characters plus 32 lower case characters, cursor and color cluster pads.

Other features are the CPU Operating System, 2× character height, page roll up, insert/delete and a user's manual. ISC offers options such as a light pen, 64 special graphics characters, a text editor, assembler, single and dual 8" disk drives (both single and double headed) and an EPROM and PROM programmer and more.

The Intecolor 8031 is priced at $4495.

Intecolor 8051

The 8051 Desk Top Computer has an 8080A microprocessor, larger 19" color CRT, insert/delete, page roll up, 48 lines × 80 characters per line format and 2× character height mode.

Other features include a graphics package with the graphics plot hardware and expanded graphics software for drawing vectors, bargraphs, lines and plotted points on a 160 × 192 grid area. Eight colors foreground and background add to the graphics capabilities and are selectable from a color cluster on the keyboard. The keyboard contains the 64 ASCII characters, lower case characters, separate cursor and color cluster pads.

For memory, the 8051 has 21K bytes of EPROM/MROM, in which resides the Disk BASIC 8001, CRT and CPU Operating System. The computer also incorporates 16K RAM, 8K of which is used for refresh, and the other 8K for user workspace. There is room for 16K bytes of additional user workspace. Total memory is expandable to 64K bytes.

An external, single mini-disk drive provides 80K bytes of data storage. This drive is supported by Disk BASIC 8001, including File Control System (FCS) commands, 26 statement types, 7 command types, 18 mathematical functions and 9 string functions.

There are 31 implemented I/O ports, one RS-232C serial asynchronous channel, and one 8-bit parallel port. An optional 24-bit bi-directional parallel port is also available.

ISC optional peripherals include a light pen, extended keyboard with 16 function keys and numeric pad, dual mini-disk drives, full 8" single and dual (both single or double headed) disk drives and a PROM Programmer.

The Intecolor 8051 price is $4495.

Intecolor 8090 Deluxe System

Intecolor 8090, Deluxe System, comes equipped with an eight color 19" data display, Intel 8080 CPU, 48 lines × 80 characters/line format, one RS232-C Serial I/O port, Protect Software, 64 ISA Characters and editing features such as insert/delete-character/line and page roll.

For graphics capabilities the Intecolor 8090 contains Graphics Plot Hardware and Expanded Graphics Software for plotting points, vectors and bargraphs. A light pen detects the

coordinates of the cursor and transmits, upon user's command, the x-y coordinates and positions the cursor to that point.

The Intecolor 8090 comes with a ROM Assembler and a SCROLLing editor. This Editor facilitates the generation and correction of user source programs and documents. SCROLL has a backwards search command.

Intecolor 8090 comes with 32K bytes of RAM and 17K bytes of ROM for memory. 8K bytes of RAM supply the screen refresh and scratch pad, and another 24K bytes of RAM is for user workspace.

A Dual 8" double headed disk drive supplies the 8090 with diskette media storage up to 1182K bytes.

A 110 cps bi-directional matrix printer provides hard copy. An EPROM/PROM Programmer is supplied for programming software.

The separate ASCII keyboard contains 8 color keys, one command key, and a 16 key numeric cluster. Sixteen function keys provide 64 additional codes.

The Intecolor 8090 Deluxe System price is $12,000.

Intecolor 8070-8071 Business System

Intecolor 8070 and 8071 Business Systems

ISC announced the Intecolor Series I Business Systems, 8070 and 8071. Both systems have an 8080A microprocessor, insert/delete-character/line, 48 lines × 80-characters/line format with 2× character height mode, eight colors foreground and background, a 110 CPS bi-directional impact printer for hard copies, and an external dual 8" floppy disk drive which provides 595K bytes of data storage.

The 8070 has a 19" color CRT, while the 8071 has a 13" color CRT with an additional built-in 5-1/4" mini floppy disk drive.

A separate keyboard with standard ASCII characters contains cursor, color and numeric cluster pads.

Both computers also come equipped with 16K of RAM and 17K of ROM. The screen uses 8K of RAM for refresh and the other 8K for workspace. Memory is expandable to 24K of RAM workspace and 15K bytes of special EROM software.

Other features include Extended Disk BASIC which incorporates Disk BASIC containing 12 FCS commands as well as multi OPEN/CLOSE files and a PUT/GET record or partial record commands. Extended Disk BASIC also has much more powerful PLOT, INPUT and RESTORE commands.

ISC offers a light pen, text editor and assembler as options. Graphics plot hardware and expanded graphics software are available as options for drawing vectors, bargraphs, lines and plotted points on a 160 × 192 grid area.

The Intecolor 8070 is $7000 and the 8071, $7500.

Arabic/Farsi Color Graphic Computer

Arabic/Farsi Color Graphic Microcomputer

ISC has a microcomputer system with the capability of generating all input/output statements in Arabic, Farsi or English.

The primary marketing target is small businesses in the Middle East with accounting, general ledger, inventory and other programs in Arabic.

Although the programming language is BASIC, all input-output statements can be in the foreign language. The terminal keyboard handler takes care of the direction of the writing and the shape of the characters depending on their position in the word. Numerals in English, Arabic or Farsi can be intermixed. Standard features include a mini floppy disk drive, disk operating system, color graphic software, RS-232C communication interface, baud rate selectable up to 9600 baud. System memory is 16K or RAM including 8K refresh, and 22K of ROM containing fresh, and 22K of ROM containing BASIC and the operating system.

Optional peripherals are a dual language printer, 8" disk drives, light pen and PROM/EPROM programmer.

For further information on any of these computers, contact Joy Baker, Marketing Representative, Inelligent Systems Corporation, 5965 Peachtree Corner East, Norcross, GA 30071; (404) 449-5961. *Circle No. 100*

SYSTEMS

Microcomputer from Industrial Micro Systems

Industrial Micro Systems announced a microcomputer-based system consisting of mainframe enclosure with a cast aluminum front panel and woodside or rack-mount options. A desk enclosure is also available with the system.

A processor, I/O and memory boards make up the system. The standard configuration includes 32K bytes of memory, over 500K bytes of floppy disk storage and two serial I/O ports, all of which are expandable.

The system can be delivered with the CP/M Operating System, including a multi-user version, and the UCSD Pascal System.

For more information contact Murray Shackelford, Industrial Micro Systems, 628 N. Eckhoff St., Orange, CA 92668; (714) 633-0355. *Circle No. 101*

16-bit Microcomputer from Mikros

Mikros Systems Corporation annnounced its 16-bit microcomputer.

The Mk-16 uses a contemporary architecture which allows stack operations in conjunction with 14 accumulators. Software support is oriented around the Pascal language. The Mk-16 has two versions: the first using high speed bipolar circuits and the second using a high speed/low power SOS (silicon-on-sapphire) CMOS chip.

Dynamic Writable Control Store allows tailored user instructions which can be modified during run-time.

Although the Mk-16 is fundamentally a 16-bit machine, all instructions can operate in a byte mode. The instruction set also contains 32 bit arithmetic operations.

The Mk-16 architecture is structured to simplify assembly level programming. This is done with a symmetrical instruction set which uses over 20 addressing modes.

Standard multiplication is performed in 9.6 microseconds, with an optional high speed multiply operation performed in 2.5 microseconds.

Software capability for the Mk-16 includes Pascal P-code execution.

Mk-16 system incorporates floppy disks, CRT displays, teletypes and printers.

Mikros offers a library of development and utility software including Resident Assembler, Resident Utility Packages, Cross Assembler, Cross Simulator, Micro Cross Assembler, Disk Operating System and Cassette Operating System.

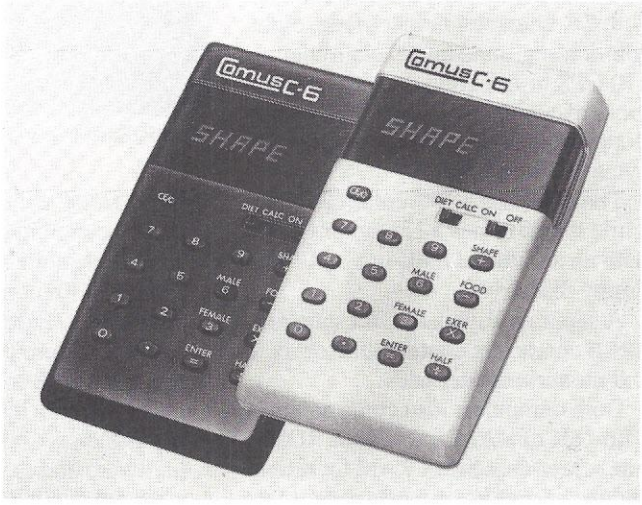
The price of the Mikros Systems microcomputer (including video display terminal, 56K byte computer system, floppy disk, monitor program and Pascal P-code software) is $12,500. For more information contact Mikros Systems Corp., 845 Central Ave., Albany, NY 12206; (518) 489-2561. *Circle No. 212*

Hand-held Diet Computer

The Comus C-6 Diet Computer computes an individual's caloric needs based on inputs of sex, height, age, weight and exercise.

The user feeds in sex, height in inches, age in years, weight in pounds and daily exercise levels by code. Exercise levels are classified by degree of physical exertion into five categories from sleep to tennis.

Since each person's metabolism is different, the inputs allow the computer to compute an individual's total caloric needs. This caloric total can be re-displayed whenever required and may be re-computed when a person changes activity levels during the day.



Next, the user enters the calories of each charcoal burger or milkshake to be eaten into the memory bank. The caloric

content of foods are shown on the right side of the display while a running total is kept of entered foods on the left. By summing up the calories for foods selected and relating them to the user's metabolism and planned exercise, the Comus C-6 shows the user how much more exercise or fewer servings are needed to keep fit and trim, the company said.

Hand-held, portable and battery-operated, the unit doubles as a four-function calculator with flowing decimal to figure cost per savings.

About the size of a pocket notebook, the unit measures about 5-1/2" × 3" × 3/4". The Comus C-6 Diet Computer comes in an off-white plastic case with an eight-digit LED display. Operating in a temperature range from 0 to 40 degrees centigrade, it is powered by one 9-volt battery. Components include a four-bit microcomputer with a ROM capacity of 2000 bytes and a RAM capacity of 128 bytes. The unit has CMOS memory and three transistors and six diodes.

Each Comus C-6 Diet Computer is packaged with a kit of operating booklets: Instructions, Calorie Counter, Exercise Levels Listing and Calculator Instructions. It is available through retail outlets for $34.95. For more information contact Comus, Inc., 4550 Cascade Road, Grand Rapids, MI 49506; (800) 253-7930 or 7931. *Circle No. 103*

Key-Edit Series 2 Intelligent Terminal Systems

Key-Edit Series 2 intelligent terminal systems were introduced by Consolidated Computer International Inc., and offer nearly one million bytes of floppy disk storage, CRT and peripherals for off-line printing and communications.

Key-Edit Series 2 terminals are available in both single and dual workstation models for data entry, billing, order entry, message transmission, data collection and networking applications.

The Key-Edit 22 system features 64K bytes of user memory, 1920-character CRT with keyboard and dual floppy disk drives with 486K bytes. Options to the Key-Edit 22 include a 340-character-per-second printer, communications controller (modem), and two additional floppy disk drives. Up to four disk drives bring memory storage to 972K bytes total. Two printers can be used in this configuration.

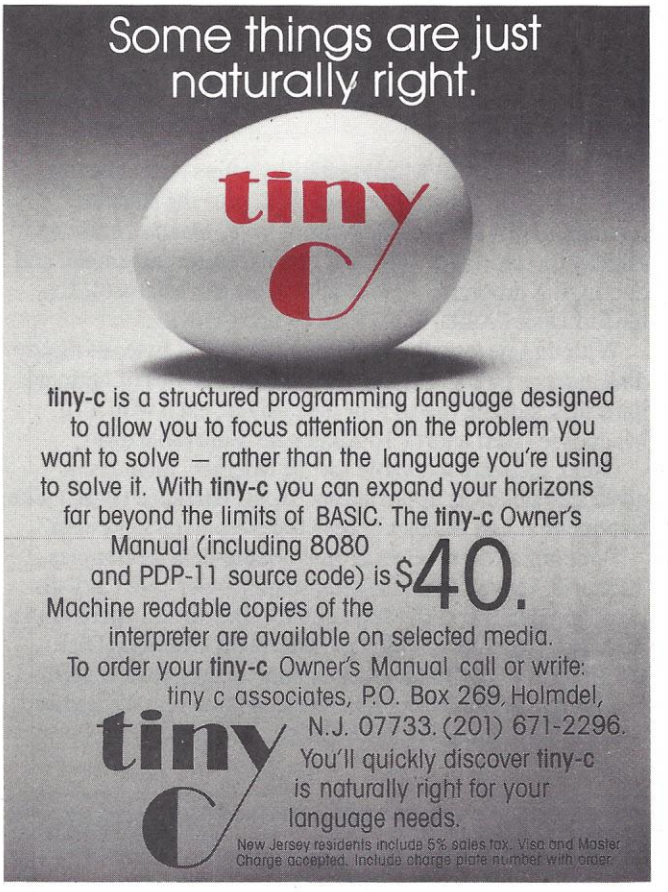
A library of utility programs sorts, moves data between peripheral devices and performs other data management tasks. These functions are under control of a hardware-stored multi-tasking monitor system which allows various operations to occur simultaneously, according to the company.

Key-Edit Series 2 intelligent terminal systems are priced from approximately $350 monthly for the basic model 22. Purchase price starts at approximately $14,000.

For more information contact Consolidated Computer International, Inc., 1604 S. Edwards Dr., Tempe, AZ 85281. *Circle No. 102*

CP/M for R2E Micral C Microcomputer

The R2E Micral C small business microcomputer system is now compatible with the CP/M Operating System, offering double-density minifloppy drives and an optional 10/80 Megabyte system with removable media.



CIRCLE 25

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CIRCLE 26

Micral C with CP/M compatibility offers user allocation of disk storage on floppies or hard disk, plus the standard features of CP/M — commands to save, rename, erase and display directories of files; and context editor, assembler and debugging program. Also available are the Microsoft Extended Disk BASIC, FORTRAN IV and COBOL.

With this system, the user can utilize 320K bytes of floppy disk storage (standard) and up to 80 Megabytes of optional hard disk storage (up to four disk drives, each with a 10 Megabyte fixed and/or 10 Megabyte removable disk).

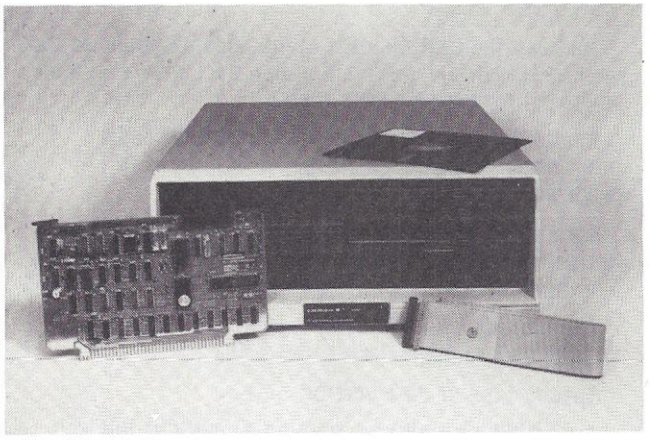
Other software available for the Micral C includes an advanced business applications BASIC language (BAL) with a sequential and random access file management system.

Price for a Micral C with dual double-density floppies, 32K of RAM, a 1920 character upper/lower case CRT display, keyboard and CP/M is $8995. The same system with a 10 Megabyte disk is $15,950. Microsoft Extended Disk BASIC is $350; FORTRAN IV is $450 and COBOL is $675. For more information contact R2E of America, 47 Bedford St. S.E., Minneapolis, MN 55414. *Circle No. 104*

PERIPHERALS

EXORdisk III Double-Sided/Single-Density Floppy Disk System

Motorola Microsystems has introduced a dual-drive, double-sided floppy disk system called EXORdisk III, which provides a removable media storage capability for Motorola's EXORciser, EXORterm and Micromodule products.



The system, designated the M68SFD1102 and M68SFDU1102E (expansion unit), offers storage for more than 1 million bytes with the basic unit and over 2 million bytes with the addition of the optional dual-drive expansion unit.

EXORdisk III consists of two double-sided/single-density drives in a tabletop cabinet, a controller board and an interconnecting cable assembly from the controller to the disk drive unit. Circuitry is included for head unload timeout and write protect feature for protection of master diskette programs. The drive enclosures contain power supplies for all voltage requirements.

EXORdisk IIIE expansion unit consists of two additional drives in an enclosure, plus the cable required to connect the drives to the system.

EXORdisk III features include: 512 bytes/diskette; 154 tracks/diskette; 26 sectors/track; 128 bytes/sector.

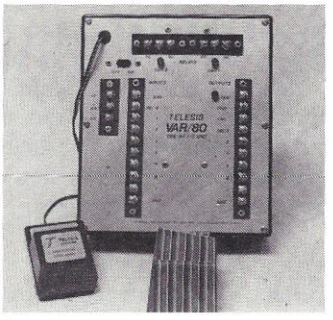
For additional information contact Motorola Microsystems, P.O. Box 20912, Phoenix, AZ 85036; (602) 962-2156. *Circle No. 176*

TRS-80 Tone Generator and Interface Unit

Telesis Tone/80 Programmable Tone Generator was designed for Radio Shack TRS-80 Level II owners. The Tone/80 responds to output commands from the TRS-80 and can produce 128 different tones. The unit can be used to create sound effects for games, compose musical tunes or add sound to a burglar alarm, Telesis said.

Tone/80 is shipped completely assembled, tested and guaranteed and requires no additional interfacing with the TRS-80. The Tone/80 Programmable Tone Generator is equiped with approximately 2' of ribbon cable with mating connector and can be plugged into either the TRS-80 keyboard module or the screen printer port on the expansion interface.

The unit includes a documented data and applications package that includes software for producing whistles, sirens, phasor sounds and tunes. Also included are notes on how to add various sounds to computer games. The complete package is available for $89.95.



Telesis also markets the VAR-80 interface unit. The VAR-80 mates directly with the TRS-80 by connecting its compatible 40 pin edge connector via the expansion port or the screen printer port on the TRS-80. It can be used with or without the TRS-80 expansion interface unit.

The unit provides 8 inputs (2 are opto-isolated and 6 are TTL compatible) and 8 outputs (2 relays rated 110 V at 3 amps and 6 TTL). The unit is shipped completely assembled, tested and with 2 feet of interconnecting cable.

The data package included with the VAR-80 gives operating instructions, applications, sample programs and some sample circuits. One of the programs included demonstrates how the TRS-80 can be used as a digital lock with the VAR-80 and an external keyboard. Price is $109.95.

For more information on the Tone/80 or the VAR-80,

contact Telesis Laboratory, Peripherals Division, P.O. Box 1843, Chillicothe, OH 45601; (614) 773-1414. *Circle No. 177*

Hard Copy System from Trilog

Trilog, Incorporated, has announced the T-100G Printer/Plotter with Graphic Adapter Board that enables a Trilog T-100 Printer/Plotter to make hard copies from up to two Tektronix 4000 series graphic CRTs at 100 dot per inch density.

The unit plots the CRT image on standard 14-7/8 plain fanfold paper or, by using the 90 degree rotation feature, copies are made on 8 1/2 x 11 format. The T-100G can print or plot on-line from any popular computer at 250 lines per minute.

CRT image copies are made in 40 seconds on single or multipart forms. Also included is a self test mode to verify proper operation in both print and plot modes. Plot density is 100 dots per inch.

For more information contact Trilog, Inc., 16750 Hale Ave., Irvine, CA 92714; (714) 549-4079. *Circle No. 178*

TRS-80 Hardcopy Interface

The GPA Hardcopy Interface for TRS-80, from GPA Electronics, plugs into the back of a Level II system or into the expansion interface. The interface allows printing with the LPRINT and LLIST commands of Level II. Features include standard DB-25S Connector for serial printers, internal power supply and necessary software. Both RS-232C and 20 ma current loop models are available. A parallel printer model is also available. For more information contact GPA Electronics, Inc., 906 Blair Avenue, Oakland, CA 94611; (415) 654-3898. *Circle No. 105*

Sanders Hard Copy Matrix Switch

A new hard copy matrix switch enables a single Sanders 570 Hard Copy Unit to provide high-quality, cursive stroke copies from as many as four Graphic 7 display systems, according to Sanders Associates, Inc.

Designed for users of multiple graphic systems, the Sanders Model 575 Hard Copy Matrix receives the standard set of random scan X, Y and Z signals from each of the Graphic 7 terminal controllers and multiplexes the signals into a single set of signals for input to the 570 hard copy unit. Because the matrix switch provides complete transparency of operation, each Graphic 7 operates as an independent unit while the hard copy machine operates as if connected to a single Graphic 7 terminal.

The switch queues copy requests from each Graphic 7 and responds to each in turn. It also allows each terminal to maintain control of the hard copy unit to generate an uninter-

for PET, TRS-80, Compucolor

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CIRCLE 27

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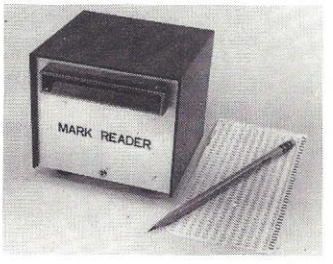
CIRCLE 28

rupted sequence of copies. In addition, a manual override allows exclusive selection of any one of the four Graphic 7s.

Sanders Model 570 Hard Copy Unit, which provides cursive stroke copies for Graphic 7 systems, interfaces as a standard CRT. It operates at the same high deflection speeds as the system CRTs, eliminating the need for special adjustments, the company said.

Price for the Matrix Switch is $4000. For more information contact Marketing Manager, Information Products Division, Sanders Associates, Inc., Daniel Webster Highway South, Nashua, NH 03061; (603) 885-5280. *Circle No. 179*

Card Reader for Educators and Business People



A mark sense card reader designed for microcomputers has been announced by Chatsworth Data Corp. The hand-fed reader, designated the MR-500, measures 4-1/2 inches in all directions and weighs less than five pounds. All power required by the reader is derived from a U.L. approved AC to DC converter. The MR-500 accepts cards of variable length marked with a standard number two pencil. The card data is converted to either ASCII or card image.

Special interfaces allow the reader to be connected directly to TRS-80, Apple II and PET computers. The unit meets all U.L. requirements. The MR-500 with interface sells for $750 with delivery of 90 days.

Chatsworth Data believes the primary users will be educators who will use the reader to solve "Queing" problems in teaching programming, to score tests, to mark attendance and to report grades. Another major market is small businesses, where the reader can be used for inventory control, time cards and labor distribution.

For more information contact Chatsworth Data Corp., 20710 Lassen St., Chatsworth, CA 91311. *Circle No. 180*

Applied Devices POS Terminal

Applied Devices Corp. announced that Datatrol Inc, its Massachusetts-based subsidiary, has introduced a new low-cost, full-feature, stand alone terminal designed for specialty chain stores.

According to the company, the RS-6052 POS terminal has all the basic features of a big department store system. It can handle more than 300 types of transactions, capturing on a cartridge suitable for direct computer sales trends, inventory transaction information, including sales trends, inventory control, payroll and accounts receivable.

Its use with an in-house computer or with an outside service bureau makes the 6052 suitable for both large and small specialty retail businesses, the company said. Modular construction allows for system growth.

The basic 6052 unit, priced at $2995, includes cash drawer, calculator, split tender, logo printer and SKU check digit verification. Options include OCR-A wand reader, credit card reader, bar code wand reader, remote display and communications interface.

For more information contact Applied Devices, 1455 Veterans Memorial Highway, Hauppauge, NY 11787; (516) 234-4000. *Circle No. 181*

Mini-Disk Terminal Adds Intelligence to Data Communications Equipment

Word-processing and other intelligent functions have been given to Siemens telex and data communications equipment through the use of a new mini-diskette terminal. Called the Siemens Micro-Disk, the terminal features a single-sided disk which measures a little over 5-inches in diameter, has a 200 K character storage capacity and full message-editing features.

The microprocessor-based terminal is available in either ASCII 8-level or Baudot 5-level code and is plug-compatible with Siemens T-1000 electronic telex or Siemens PT-80 TWX/DDD printer. The terminal expands or replaces paper tape capability, and can be field installed on existing Siemens equipment. The new system allows operators to: compose and edit in solid state memory and then transfer the accurate message to disk for transmission; quickly recall messages and retransmit from disk storage under keyboard control; conduct two-way communications at speeds up to 9600 bps on 8-level and 2400 bps on 5-level machines to allow mass dumping and receiving at the disk (data can then be printed at printer speed); obtain formats automatically through the use of standard formats prestored on the disk; code disk in a system designed to prevent unauthorized tapping of data.

The terminal operates on switch-selectable transmission rates ranging from 50 through 9600 bps depending data code used. The unit stands 5-1/4" x 10" x 11-3/4", weighs 13 pounds and fits on an office desk or typewriter table. Normal house current power supply will suffice.

Additional information is available from the Data Communications Division, Siemens Corporation, 186 Wood Avenue South, Iselin, NJ 08830. *Circle No. 189*

Beehive's Micro Bee Terminal

Beehive International has introduced Micro Bee, an 8085A microprocessor controlled terminal costing $995. User oriented features include fixed tab stops every eight character positons; switch selectable scroll/non-scroll mode; and a non-destructive blinking cursor. The line drawing capability allows for the creation of graphic displays using the vertical and horizontal line feature. The 25th status line is used extensively by the Micro Bee System firmware to display modes of operating, error messages, communication protocol data and a time-of-day clock as well as a status message showing optional switch configurations.

For more information contact Beehive International, 4910 Amelia Earhart Drive, Box 25668, Salt Lake City, UT 84125; (801) 355-6000. *Circle No. 188*

COMPLEMENTS

Diskette Storage Pockets

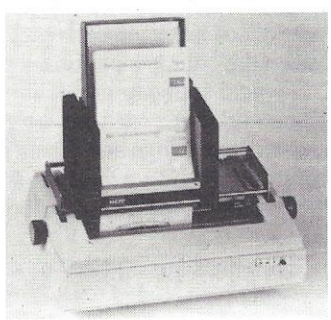
Clear vinyl diskette storage pockets, with pressure sensitive backing, are available from Printcraft Systems, Inc.

The pockets adhere to any flat, dry surface, converting standard and hanging file folders into a storage and retrieval system. In addition, original and/or hard copy printout can be stored together.

Sold in packages of 50, the pockets retail for $17.50 per package. For more information contact Printcraft Systems, Inc., 11-17 Beach St., New York, NY 10013.
Circle No. 149

Two Printer Attachments for Forms

MQI Computer Products announced two printer attachments: the Model BDT 160 Automatic Sheet Feeder and the FT210 Forms Tractor. Both attachments can be used on any system with Qume or Diablo Daisy Wheel Printers.

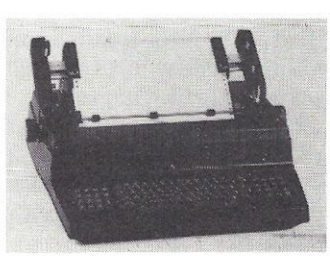


The Model BDT 160 Automatic Sheet Feeder requires no external interface.

Individual sheets are treated as continuous forms under the microprocessor control of the Sheet Feeder. Up to 250 sheets of 20 pound paper can be fed automatically from the interchangable 11″ and 14″ feed trays. A chute allows the operator to interrrupt a continuous feed operation at any time to insert another type of document.

Computer terminals equipped with the Model 160 Feeder can handle cut form sets automatically for applications such as check writing, invoicing or sales and purchase orders, according to the company. The Model 160 has self-contained control circuitry that requires only an "initiate" signal from the printer to cycle the completed sheet into the storage tray and replace it with a fresh sheet.

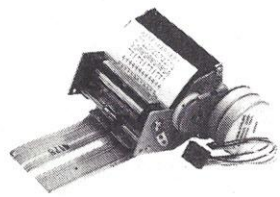
The 160 Sheet Feeder price is $1025.



Tractors on the BDT Model FT210 engage the continuous paper on both the in-feed and out-feed so the paper can be positively positioned in either direction. This facilitates plotting, graphing and variable insertion.

PRINTER MECHANISMS
and
PRINTER ASSEMBLIES

$36.00*



PL 12 Mechanism

- 20 & 12 Column Thermal Printers
- 2½ lines per second printing speed
- 8 bit parallel interface
- 5 x 8 ASC II character set with underline capability
- Invert mode (printer can be mounted in any position)
- Self test mode
- Paper out provision
- Remote switching provision

$189.00*

PL 20 Mechanism with interface (PL 20A)

- Requires 5 volts at 150 mA and 20 volts at 500 mA
- PL 12 measures 3½" W x 3"L x 2½"H. PL 20 measures 4⅝"W x 5½"L x 2" H
- Single unit prices for the PL 12, PL 20, and PL 20A are $59.95, $99.95 and $297.00 respectively

*In quantities of 100 units

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CIRCLE 29

BAS

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CIRCLE 30
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LS120 DECwriter III, RO	1,995	190	104	70
LA180 DECprinter I, RO	1,995	190	104	70
VT100 CRT DECscope	1,695	162	88	59
TI745 Portable Terminal	1,875	179	98	66
TI765 Bubble Memory Term.	2,795	267	145	98
TI810 RO Printer	1,895	181	99	66
TI820 KSR Printer	2,395	229	125	84
ADM3A CRT Term.	875	84	46	31
QUME Letter Quality KSR	3,195	306	166	112
QUME Letter Quality RO	2,795	268	145	98
HAZELTINE 1410 CRT	895	86	47	32
HAZELTINE 1500 CRT	1,195	115	62	42
HAZELTINE 1520 CRT	1,595	152	83	56
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CIRCLE 36

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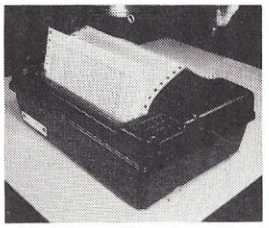

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CIRCLE 37

WHAT'S COMING UP

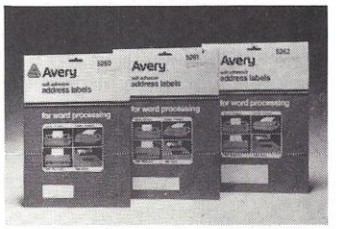
Continuous forms from 4" to 14" wide can be used, and a disengagement switch allows front feeding of cut forms or ledger cards without removal of the continous forms.

Paper tension around the friction platen is implemented by adjusting the tractor vertically, and positive-lock upper and lower lids hold the paper to the tractor teeth.

The FT210 is $230.

For more information on the BDT 160 or FT210, contact MQI Computer Products, 2315 S. Otis St., Santa Ana, CA 92704; (714) 751-2005. *Circle No. 150*

Self-Adhesive Address Labels for Word Processing Machines



Three self-adhesive address label sizes for word processing machines were introduced by Avery Label.

Designed specifically for generating mailing labels on word processing printers such as Qume, Diablo, IBM Mag Card and IBM O/S 6 Ink Jet Printers, the labels are available in three sizes: #5260, 2-5/8" × 1", #5261, 4" × 1"; and #5262, 4" × 1-1/2".

Alignment in the word processing printer is achieved by special "gripper" edges that allow utilization of the first and last row of labels on each sheet. Vertical perforations between the columns on each sheet facilitate separation.

Typical applications include notices and bulletins, statements, price list changes, newsletters, sales force mailings, customer mailings and repetitive correspondence. Label counts per package include: #5260 small size, 600 labels; #5261 medium size, 400 labels; #5262 large size, 280 labels.

Each package is priced at $3.45. For more information contact Avery Label, 777 E. Foothill Blvd., Azusa, CA 91702. *Circle No. 151*

5.25" Mini Flexible Disks

A line of 5.25" mini flexible disks has been introduced by Kybe Corporation. The line is compatible with soft sector, 10 sector and 16 sector mini disk drives used in word processing, personal computing and minicomputer systems. The mini disks are certified 100% error-free and are rated to last more than 12 million passes without disk related errors or significant wear, according to the company.

Hard plastic library cases are also available. Prices range from $3.75 per disk. For additional information contact Kybe Corporation, 132 Calvary St., Waltham, MA 02154; (617) 899-0012, or toll free (800) 225-8715.
Circle No. 152

SOFTWARE

Consumer and Business Packages

Small Business Computer Services introduced its new business and consumer line software packages for the Micropolis MOD II Disk System.

The consumer line consists of the Investment Pack with programs covering a range of investments, including options analysis, bond analysis, intrinsic value of stock (Molodovosky method) and a complete portfolio management system. Many programs are disk interactive.

Another in the consumer line, the Family Pack, is aimed at the home, with programs ranging from family/home budget analysis to mail and phone lists, as well as tutorials in math and spelling.

The Investment Package and the Family Package are $35 each or $60 for both.

The business line of software consists of an Accounts Receivable System which also provides complete cash receipts journal; aged accounts receivable report; and total sales report complete with breakdowns of taxes, freight, non-taxable sales and taxable sales. Other features are the assignment of commissions to salesmen, complete by-salesman report of sales and commissions and status of commissions payable. Also provided are the utilities that allow you to view various files, maintain files and sort.

Other business program packages are General Ledger and Accounts Payable. The Accounts Payable system allows for twenty invoices per vendor with random access files. This program prints a complete status of accounts, has satellite reports that document the account paid and directs the totals to the appropriate General Ledger account.

Business program packages are $250 for both the accounts receivable and payable packages. Each package purchased separately costs $150.

All business software has been designed around a dual drive Micropolis MOD II disk drive and 48K RAM, 8000 and Z-80 CPU, and printer.

For more information contact Small Business Computer Services, 813 MacArthur Dr., Urbana, IL 61801.
Circle No. 153

Yourdon C Compiler and Language

Yourdon Inc. has completed the final stages of testing and documenting the Yourdon C Compiler.

C language, designed to be a systems implementation language, supports structured program design, separately compiled modules and contains features for program maintenance. C program interface with underlying system environments; specifically, any input/output or real-time control operations, and any character manipulating programs such as compilers, graphic packages or text editors. Language features are implemented in a manner that makes the language and its compiler portable to other computer system, according to the company.

The Yourdon compiler, written in the C programming

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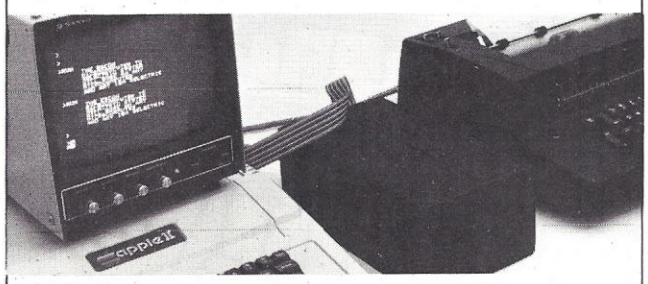

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(415) 935-4590

CIRCLE 31

That's right. The famous Computalker CT-1 Speech Synthesizer that produces highly-intelligible natural sounding speech can now be installed on your TRS-80.

Completely self-contained, the Model CT-1T comes with its own chassis and power supply, on-board audio amplifier (2 Watts), CSR1 software, and interconnect cable. The CT-1T comes with complete documentation and is available on either 5¼ inch diskette or cassette. TRS-80 Level II and 16K words memory required, 32K words recommended.

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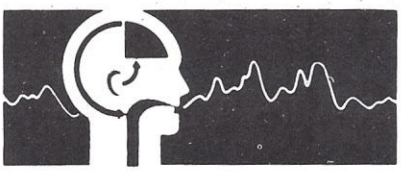

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language, will produce code for all models of the DEC PDP-11 family of minicomputers. The compiler runs under any DEC operating system for the PDP-11, specifically, RSX, IAS, RT-11, RSTS-E, and VMS, as well as Western Electric's UNIX operating system. C compilers for the IBM 370, PDP-10, VAX-11/780, Zilog microprocessor and other minicomputers are planned. The compiler will be offered with Yourdon's version of the standard input/output library, which will make any system independent C program portable between different computer systems.

The supported Yourdon C compiler is licensed for $5000 with discounts available for installations with mulitple CPUs and for educational institutions. Yourdon offers training in the C programming language, and in UNIX and its applications. For more information contact Yourdon Inc., 1133 Avenue of the Americas, New York, NY 10036; (212) 730-2670. *Circle No. 154*

File Transfer Software from Xener Corporation

Xener Corporation has made available software which will directly transfer files between the two microprocessor operating systems, ISIS and CP/M.

The software operates under ISIS-II on any INTEL MDS system. The transfer is direct; thus no intermediate diskette is required. The files may be transferred to or from either system diskette. Both double and single density diskettes are supported.

The price of Xener's transfer program is $150, and it's available from stock on a single or double density ISIS-II diskette.

For more information contact Xener Corporation, 6641 Backlick Road, Springfield, VA 22150; (703) 569-5050. *Circle No. 174*

Business Data Files for the TRS-80

Johnson Associates announced the availability of a TRS-80 based Index Sequential Access Method for controlling business application files on diskette.

The ISAM system is a series of subroutines the user includes in the application program. Calls to these subroutines store or retrieve data by referencing a "key field" within the record. An additional set of utility programs allows the user to create a new data file or to reorganize an old one. All ISAM files are supervised by the TRS-80 Disk Operating System, thereby providing standard space allocation, directory, copy, kill, backup and password services.

Users create an ISAM file by defining the lengths and types of up to 22 fields per record. Field lengths can be any length up to a total record length of 252 characters. Records are blocked within physical diskette records to minimize file space requirements. This logical record blocking/deblocking as well as field separation/combining is accomplished for the user based upon data file attributes specified at create time. Any record field may be designated as the key field and all subsequent adds and retrieves are based upon the content of this field. Records may be added, updated or deleted at any time and in any sequence. Records may be retrieved either by

key or in key sequence. The system allows up to 15 ISAM files to be open simultaneously; however, memory requirements for such an application would be large.

The ISAM file organization maintains an index of all records stored in the data set and is updated as records are added. Since the index is maintained in key sequence, sequential record retrieval is accomplished without sorting. In large files the index will be made up of several index records scattered throughout the data set. At file open time an in-memory index is constructed to enable retrieval of the appropriate index block.

The TRS-80 ISAM package is available for $50. For more information contact Johnson Associates, P.O. Box 352, Palo Cedro, CA 96073. *Circle No. 156*

Statistical and Numerical Analysis for the HP 9845

Three new application software packages from the Hewlett-Packard Company enable the HP 9845 desktop computer to conduct statistical and numerical analysis programs.

The Statistical Graphics software package enables the computer to convert numerical data into graphical plots and present them on the HP 9845's CRT display or printer. A variety of routines for entering, editing, transforming and otherwise manipulating data are available with the software. There is also a choice of nine plotting routines including time series, histogram, scattergram, semi-log and log-log. Plotting parameters can be selected automatically.

The General Statistics software package is divided into five sections. Four contain statistical tests, including one-sample, two-sample, two-sample independent and multiple-sample. Each has several tests of the same hypothesis to allow the most accurate choice. The fifth section contains the most commonly used statistical distributions, thereby eliminating the need to consult tables.

With the Non-Linear Regression Analysis software package, the computer determines the best fitting curve for a set of data using combinations of algebraic or Boolean expression involving one or more independent variables and as many as 10 parameters. It also includes a set of routines to analyze residuals to check the quality of curve fit. These computation use Marquardt's method of estimating non-linear parameters — a compromise between the Taylor Series method and the steepest descent method.

Each software package price is $500 in the U.S. For more information contact Inquiries Manager, Hewlett-Packard Company, 1507 Page Mill Rd., Palo Alto, CA 94304. *Circle No. 159*

Interactive Financial Reporting Package for Wang VS Computer

Users of Wang VS (Virtual Storage) business computers can now install the Software International General Ledger and Financial Reporting System.

The new package gives accounting and financial personnel an interactive, data-base designed system. Features include a Report Writer for designing, implementing and controlling reports; roll-up and spreading versatility to perform

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CIRCLE 33

dollar summarization in an unlimited number of directions; and auditor-approved control techniques.

The General Ledger and Financial Reporting System is priced at $15,000 in the U.S. For more information contact Wang Laboratories, Inc., One Industrial Ave., Lowell, MA 01851; (617) 851-4111. *Circle No. 160*

Data Management System Offers Four Software Packages

A data management software package for Z-80 based microcomputers featuring a report generating and file definition capability has been introduced by Vector Graphic Inc.

The CCA Data Management System operates in four phases: file definition, data input and maintenance, sorting and report generation. It includes a data file utilization program accommodating over 1000 records per file. In the maintenance phase, records may be added, deleted, updated or inspected. Records can also be searched for a specific item of data.

For report generation the package allows specification of fields to be subtotalled or totalled and permits selection of numeric field format, paper size and printing format. It produces mailing labels as well as documents, while the sort package provides up to ten nested sorting levels.

CCA DMS runs under the MDOS operating system and Micropolis BASIC. A comprehensive user guide is also supplied.

Suggested retail price is $150. For further information, contact Vector Graphic, Inc., 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. *Circle No. 161*

ROM Software Library Enhances Programming Capabilities

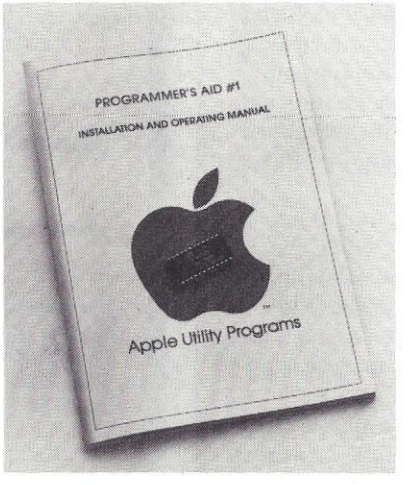
Apple Computer, Inc., has announced the Programmer's Aid #1, first of a series of software packages designed to improve user programming techniques.

The Programmer's Aid Package is a ROM based library of routines whose capabilities include high resolution graphics, program renumbering and linking, tape verification, tone generation, RAM testing and machine language program relocation.

The Programmer's Aid routines are designed for use with the Apple II computer's integer version of BASIC. These utility routines free the user from tasks such as renumbering and appending programs, and provide such programming enhancements as color graphics and sound generation programs, Apple said.

Built-in high-resolution graphics programs allow a user to draw from any one of 53,000 locations on the screen, thereby providing capabilities for creating detailed graphs, smooth curves and other fineline figures. These pinpoint locations can appear in black, white, green or violet.

Some BASIC commands such as CALL LINE and CALL SHAPE can be



used to create an entire figure in the size, orientation and color of the programmer's choice. Additional commands plot points, clear the screen and generate background color.

A dynamic RAM tester simplifies memory expansion by testing the new memory devices and precisely identifying any defective units. When a memory error is detected, the tester displays the board location (by socket number) of the malfunctioning chip.

A relocator routine allows the user to move his program to a different location in memory, automatically modifying any address information that changes as a result of the move.

Using a note table stored in memory, the Appleodeon synthesizes musical tones in five timbres spanning four octaves. This routine converts the Apple II into a programmable musical instrument accommodating a wide variety of musical applications.

The RENUMBER routine changes line numbers for all or part of a program, starting at any point and using any user specified line number increment.

The Programmer's Aid package features an APPEND program linking routine which loads a new program into memory along with whatever program is currently there, combining them into a single entity that can then be saved for later use.

A VERIFY routine assures the user that the program has been properly saved on tape before the existing version is erased from memory.

Single quantity price is $50. For more information contact Apple Computer, Inc., 10260 Bandley Dr., Cupertino, CA 95014; (408) 996-1010. *Circle No. 182*

Z-80 Linking Assembler for Vector MZ

A Z-80 linking assembler, designed exclusively for the Vector MZ microcomputer, has been released by Vector Graphic, Inc.

Called "ZSM", the new assembler supports the full Z-80 instruction set and utilizes a superset of the 8080 mnemonics. It also supports 17 pseudo-operations including "define text", "reserve storage" and "conditional assembly".

The "LINK" pseudo-op permits an almost infinite source to be broken down into small program modules. And like a subroutine, assembly continues in the "LINKED-from" file when the end of the "LINKED-to" file is reached.

For further information contact Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. *Circle No. 183*

Stock Ticker for TRS-80

A software package that allows the TRS-80 to function as an intelligent stock ticker is offered by Intersystems Software, Inc. The Tickertec-TRS, a low-end, TRS-80 version of the company's more sophisticated stock ticker

software, will be available for distribution in the fourth quarter of 1979, according to the company.

Features of the system include:

- Display of a three line current ticker, showing the trades as they are being reported from the exchange
- Automatic extraction and storage of quotations for up to 48 stocks as selected by the user
- Display and automatic updating of the current price and total volume for any stock being monitored
- Display of the history of the last 10 trades of any stock being monitored; shows the volume and price of each 'tick' recorded
- Ability to set price limits onto any monitored stock so that the user will be automatically alerted whenever particular stocks move above or below the limits set by the user
- Separation of the list of stocks into two sub-lists (each sorted and maintained in alphabetical order and displayed using separate commands to the system); allows speculations to be kept separate from current holdings, or stocks used as market indicators to be maintained separately
- Collection, storage and display of half-hourly reported data from the exchange; specifies market volume, market index, warrants volume and the indices for industrials, transportation, utilities and finance

Price for the software is $1000. For more information contact Intersystems Software, Inc., 42 Manors Dr., Jericho, NY 11753; (201) 871-4085; (516) 433-8118. *Circle No. 162*

Five Integrated Financial Programs

Rothenberg Information Systems, Inc., has available all five modules of their Integrated Financial Programs. Those five modules (General Ledger, Accounts Receivable, Accounts Payable, Payroll and Inventory Control) provide the small and medium-sized business control of its financial information. The modules may be used separately or to feed all financial transactions to the General Ledger program.

All of the programs make use of menus to prompt the operator. Accounting knowledge is not required to make good use of these programs, said the company.

The programs operate on any 8080 or Z-80 floppy disk system that supports the CP/M operating system. The software is available under license for a single CPU for $500 per module. Complete manuals including file layouts and sample reports are $8 per module.

For more information contact Rothenberg Information Systems, Inc., 260 Sheridan Ave., Palo Alto, CA 94306; (415) 324-8850. *Circle No. 163*

Disk-Based Operating System for 6800s

An operating system for the 6800 family of microprocessors, CP/68, features a combination of memory-resident and transient commands. The user can also add his own commands to the system. PIP, the Peripheral Interchange Program, allows transfer of data between physical devices. Wildcard operation of all disk commands lets you specify files either ambiguously or unambiguously.

Other features of the operating system include: complete device-independent I/O; sequential and random file access methods; dynamic allocation and expansion of files; command files; chaining and overlaying of user programs; requires less than 8k memory; extended instruction set including 19 new 6809-type instructions (PSHX, PULX, etc.); all DOS services available through a single Supervisor call; and it interfaces to new devices and peripherals.

For more information contact Hemenway Associates, Inc., 101 Tremont St., Suite 208, Boston, MA 02108; (617) 426-1931. *Circle No. 164*

Inflation Beaters for Accountants

National Software Marketing Inc. has released two more Inflation Beaters software packages for accountants. These are the TAS (Time Accounting System) and CIS (Customer Information System). TAS is priced at $1200; CIS at $600. The packages are written in BASIC and run on all Wang systems using standard size floppy disks.

The TAS is a highly specialized billing and accounts receivable system

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that keeps track of all billable time spent on each client, and bills specific transactions and/or bills on a retainer basis.

The system is divided into two areas: Work in Process and Accounts Receivable. Reports produced by Work in Process area are: client YTD and work in process; employee master listing; work code master listing; and work in process and bill request.

Reports produced by the Accounts Receivable area are: a billings and credits report; collections report; customer master report; open receivables report; aged accounts receivable report; and statements.

CIS contains a profile of all the clients a firm is handling and keeps track of the reports and work that must be done on each account. It also stores information on who is handling the account and schedules the work by dates, allowing a tighter control of each account, the company said.

The reports produced on the system are: client master listing; client data sheet; labels for mailing and filing; client tax report; client service schedule (by partner, supervisor or staff); client year-end report; and listing of clients by entity and business.

The system handles 900 clients on a diskette version. For more information contact National Software Marketing Inc., 4701 McKinley Street, Hollywood, FL 33021; (305) 961-4888 or 625-6062. *Circle No. 165*

Wordsmith Word Processor

Wordsmith is a word processor for Z-80 based computers with North Star disk systems, an RS-232 terminal and a Diablo 1620 or equivalent printer. Features include complete cursor control, block movements, string searches and alterations, insertion and deletion of text and other editing functions through the use of control commands.

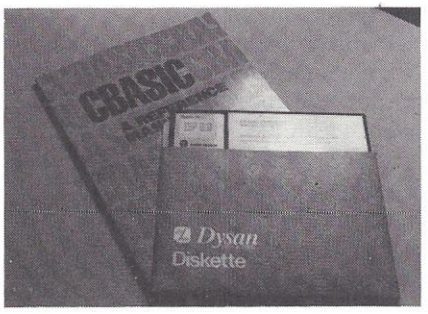
Print formatting commands are entered along with the text and allow the format to be changed while the print is taking place. The format commands include right justification, setting of margins, automatic paging and headers, four types of paragraphs, insertion of variable data into the text and operator instructions. Through the use of simple text commands, personalized form letters can be produced.

Disk file creation, deletion and updating is handled automatically by Wordsmith. The Disk Control Subsystem assists file maintenance.

The Wordsmith is priced at $299. For further information contact Southwest Micro-Systems, P.O. Box 20088, Riverside, CA 92516; (714) 684-7085. *Circle No. 166*

CBASIC-2 for CP/M

Version 2 of CBASIC has been announced by Software Systems. CBASIC is a comprehensive commercially oriented compiler/interpreter designed for the CP/M operating system.



CBASIC-2 improves on the original version by adding integer variables, chaining with common variables, multiple line functions and a Cross Reference Lister for program variables. Intermediate files are smaller and execution is faster, the company said.

For more information contact Software Systems, P.O. Box 145, Sierra Madre, CA 91024. *Circle No. 167*

TSC BASIC for the 6800

Technical Systems Consultants, Inc., has made available the TSC BASIC for the 6800. The program resides in 9.5K of memory. All of the standard BASIC statements and functions are supported as well as many extended capabilities. Both floating point and string variables are provided, with strings being fully dynamic and unrestricted in size. Variable names may be either the standard types or double letter combinations, allowing limited variable name mnemonics, said the company.

Other features include single and double dimensioned arrays. An enhancement is provided by the 'IF ..THEN..ELSE' style, thus improving readability and conciseness of the program, said TSC. The input buffer allows lines as long as 127 characters to be entered to take advantage of the complex statement structures permitted with this statement. Other features include the HEX function which allows hexadecimal number representation, while PI provides an easy reference to this constant. The floating point arithmetic done by BASIC is performed to seven digits accuracy internally, with all answers printed to six. The dynamic range of the numbers is in the range of 10 raised to the plus or minus 37th power.

The BASIC is available on Kansas City Standard cassette along with a user's manual for $39.95. For more information contact Technical Systems Consultants, Inc., Box 2574, West Lafayette, IN 47906; (317) 463-2502. *Circle No. 168*

Two Business Software Packages

PolyMorphic Systems announced two business software packages for its System 88: Mailist and Language for Analysis.

Mailist lets the user organize information according to requirements of the specific mail list. For example, if overseas addresses are common to the list, the user may want to allow a special entry for province, country and/or mail codes.

Mailist entry format may also be organized to store specific data associated with the mailing name and address, which may never appear on the actual mailing label. Not only does the user organize the entry format, the user can indicate, by field, the order in which information is to be printed.

Mailist can be implemented as a general data base organizer, storing information having nothing to do with mailing campaigns. The user may define a format for a record album index, a bibliography or other catalogs, the developers said.

The Mailist package includes a manual with examples. Mailist is designed for a two-drive, 32K, System 8813.

The second package, PolyMorphic Systems Language for Analysis (PLAN), allows business and pro-

fessional people to describe the numerical aspects of a proposed business or financial plan. PolyMorphic's desktop computer, the System 88, then executes this "model" and reports the likely effects of operating according to the planner's assumptions expressed in the model.

The user of PLAN, without programming knowledge, responds to questions about the assumptions and beginning data values of the analysis desired, the calculations to be performed on the data, and the format and contents of the desired report. The computer can repeat the model, varying the assumptions and initial values with each execution.

PLAN has been used in Cash Flow Planning, Profit/Loss Projections, Manpower Planning, Make/Buy Analysis, Real Estate Investment Analysis and other types of time period analyses. PLAN, including hardware and software, costs about $7000. For more information on Mailist or PLAN contact PolyMorphic Systems, 460 Ward Dr., Santa Barbara, CA 93111; (805) 967-0468. *Circle No. 169*

Two TRS-80 Programs

ComputerCo, Inc., announced two TRS-80 products. One is a Key Board Input Utility (KED). Used in their 8080 KFAM data base, the KED is a general purpose editing input routine. Designed to be attached to a user's program, this utility accepts alphanumeric input data, signed or unsigned, and edits the type of data, the length of the field, whether signed, whether check digited or not, and if check digited whether the check digit is valid. The KED references an error subroutine, also accessible by the user program, that indicates the type of error made. KED can void entries, duplicate previous input, skip fields, back up to correct entries and spot the end of data.

The second product is a civil engineering program called Traverse. This program takes survey points and coordinates and calculates the error of closure and gives the area of the closure.

For information contact the Frontier-Breakers at ComputerCo, Inc., 5833 Dorchester Road, Charleston, SC 29405; (803) 552-9424. *Circle No. 170*

Home Money Management

The Programming Shop has announced personal computer software for home money management. According to the company, the system saves time and gives budget control to the user. All past money transactions for the current year are stored in a personal data base. Weekly, monthly and annual balances are displayed on a video screen for income, payments, taxes and interest.

Act-I Software's projections tell the user when he can spend wisely and avoid spending when the budget is already committed to its limit. The program tells where you are spending money and keeps track of deposits as well as withdrawals from savings accounts. A five week preliminary checkbook balance is a sub-routine of the system, as is the "actual" checkbook maintenance routine.

The program is contained on one side of a five minute cassette tape, available for Radio Shack 16K, Level II TRS-80.

Documentation includes a glossary, system overview, operating instructions, and information for the tinkerer who likes to go into the code and put in his own personal touch.

A complimentary Newsletter is mailed monthly to customers who purchase the software package. The newsletter contains program tips and hints about operating your system, and allows users to share experiences.

The system is available for $79.90 from The Programming Shop, P.O. Box 11219, Palo Alto, CA 94306; (415) 321-9621. *Circle No. 171*

PET and TRS-80 Speakeasy Software

Speakeasy Software has made available its consumer-oriented software for the PET and the TRS-80, in addition to its Apple versions. The titles fall into two categories: The Continuing Education Series, which includes Financial Analysis and Transactional Analysis; and the Home Entertainment Series with Warlords, Bulls and Bears, Sportstrivia, Microtrivia and Kidstuff. These products are sold through computer stores.

Soon-to-be-released titles include Marketing, Improved Sentence Structure and Classic Automobiles.

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RS232 Cables	$25

Call for quotation on Diablo, NEC Spinwriter, and others.

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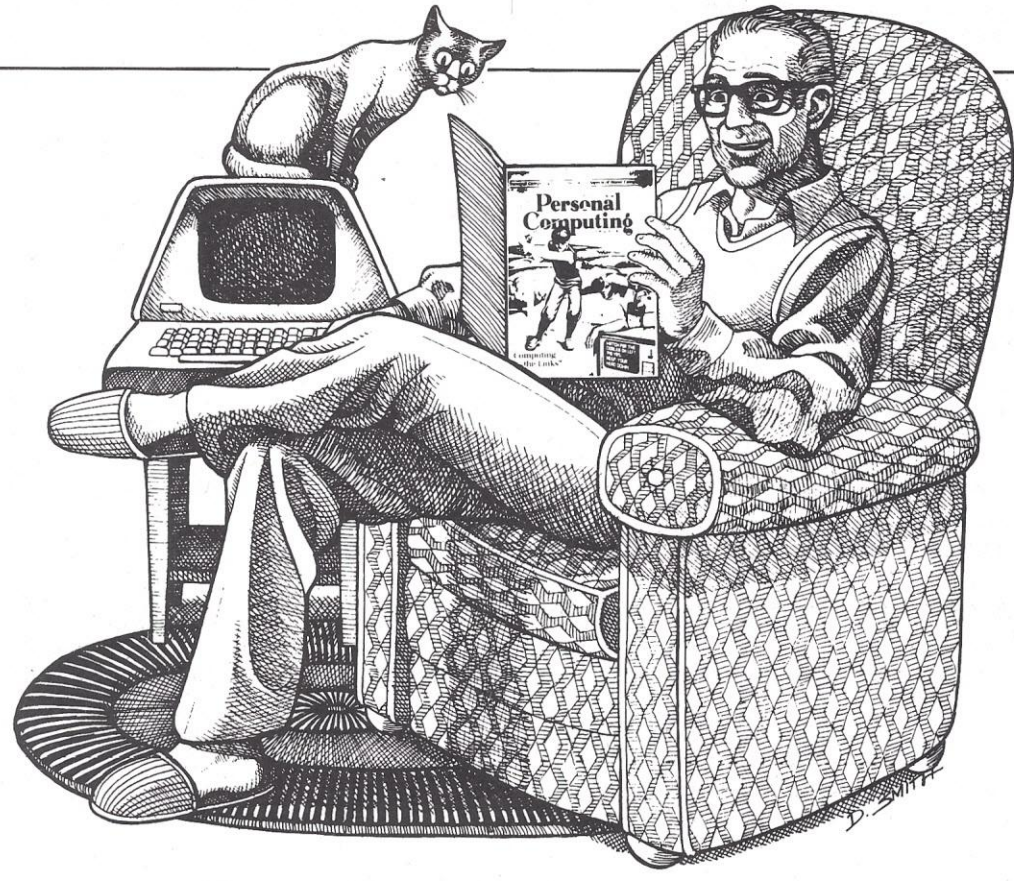

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For more information contact Speakeasy Software Ltd., Kemptville, Ontario, Canada K0G 1J0; (613) 158-2451. *Circle No. 175*

TRS-80 Business Analysis Programs

Applied Economic Analysis has released several advanced business analysis programs for the TRS-80.

These programs, developed by Dr. David M. Chereb (economist), will run on Level II 16K machines. These programs come with a user's manual that explains not only how to use the program but why they're used in business planning and analysis.

Software available includes advanced multiple regression ($39), Monte Carlo risk analysis ($39), seasonal data adjustment ($23), capital budgeting ($31) and forecasting ($31). The programs are sent on either mini disk or cassette tape.

For more information contact Applied Economic Analysis, 4005 Locust Ave., Long Beach, CA 90807; (213) 424-3652. *Circle No. 190*

CP/M Business Software from California Microcomputer

CP/M compatible business application software is available from California Microcomputer Co. Their packages include General Ledger, Accounts Receivable, Accounts Payable and Payroll.

General Ledger features ledger file maintenance; 26 user definable journals; interactive entry of journal transactions; account trial balance on request; journal list; detailed ledger account list; and profit-and-loss statement and balance sheet printing.

Accounts Receivable includes open item and/or balance forward; customer file maintenance; interactive cash receipts entry; interactive credit memory entry; interactive entry of invoice information; listing of invoices and credit memos; posting of information from cash receipts, credit memos and invoices to accounts receivable master file; and aging report printing.

Accounts Payable includes vendor file maintenance; interactive entry of credit memo and invoice information; automatic creation of vouchers from invoice file; automatic check printing; posting of all information from vouchers and checks to accounts payable master file; and printing of aging reports.

Payroll features hourly and/or salary pay rates; complete employee file maintenance; time card entry; department and job costing; gross pay reports; deductions from gross pay; printing of payroll register; printing of payroll checks; printing of federal and state quarterly tax information; printing of W-2 forms; printing of month-to-date, quarter-to-date and year-to-date pay information for inactive and/or active employees; and changeable FICA, state and local tax rates.

Prices are: General Ledger, $890; Accounts Receivable, $750; Accounts Payable, $750; and Payroll, $750. Contact California Microcomputer Co., Inc., P.O. Box 3199, Chico, CA 95927; (916) 891-1420. *Circle No. 191*

Micropolis Software Packages

Basically Speaking markets software for Micropolis minidisk systems. The first three programs are Statpak, Gradebook/Reportcard and PAL (Personal Accounts ledger).

Statpak creates a data file and does multiple statistical analyses on a data base. Statistical functions available include Chi Square, ANOVA and Linear Regression.

Gradebook allows school teachers to use their computer as a gradebook. Multiple classes are allowed, as well as missing assignments, excused absences, and addition and deletion of student records. A grade figuring program is included (REPORTCARD); it may be run at any time during the semester.

The PAL (Personal Accounts Ledger) program keeps a checkbook ledger, a savings ledger, a small business ledger and an investment ledger. Selected account printing is also supported.

The $45 price for each diskette includes a Micropolis MDOS (Mod I or Mod II) or Micropolis CP/M (BASIC-E) diskette, instructions for use, suggestions for modifications and complete listings.

The company also offers Exidy Sor-

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cerer, Radio Shack TRS-80 (Level I and Level II) and Apple programs. For more information write Basically Speaking, 719 Anna Lee Lane, Bloomington, IN 47101. *Circle No. 192*

Word Processing Software for Vector MZ

Vector Graphic Inc. developed a word processing software system for the Vector MZ small business computer.

The Word Management System (WMS) has internal 32K or 48K RAM memory boards, a 64 × 16 Flashwriter board and two special PROMs on a 12K PROM/RAM board. The configuration requires a video terminal and high-speed, bi-directional typewriter-quality printer.

System software incorporates automated typing and editing capabilities including preparation of printed documents.

WMS allows modification without retyping, storage on magnetic diskette and retrieval to enter changes, according to the company. Text drafts may be printed at any time and users can then modify and reprint in any quantity. The system is also designed to use non-technical vocabulary.

The Word Management System is priced at $450. For further information contact Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. *Circle No. 193*

PerCom Super BASIC for 6800 Computers

PerCom Data Company announced PerCom Super BASIC for 6800 computers using PerCom's LFD-400 or LFD-1000 mini-floppy disk systems.

An extended disk BASIC similar in dialect to Southwest Technical Products' SWTP 8K BASIC, Super BASIC supports 42 commands and 31 functions. The program requires 12K bytes of memory.

Super BASIC is compatible with programs written in SWTP 8K BASIC (versions 2.0, 2.2 and 2.3). Features include:

- direct random acccess to disk file data
- optional use of the question mark (?) in lieu of the PRINT command
- 9-digit BCD arithmetic
- named disk file and batch processing capability when used with PerCom miniDOS
- line and character position error reporting; mnemonics used instead of numeric error codes
- fast execution of function calls

PerCom Super BASIC includes 42 commands and statements, and features:

- PRINT USING — for report formatting
- LINPUT — used to enter a line of text into a single string variable
- BASE — for automatic linking of programs (equals LOAD + RUN)
- CHAIN — string length control (6- to 127-character strings)
- RESTORE — used to reset data pointer to specified statement

Functions include BUFR, which permits PEEKing and POKEing into data file buffers; MEM, which returns the amount of memory, in bytes, still available; VARPTR, which returns the decimal address of a numeric or string variable, and is useful for PEEKing or USER function calls; and, PI which returns the value of pi to eight decimal places.

Upgrade kits for using Super BASIC with SWTP or Smoke Signal Broadcasting Company disk systems are also available.

Super BASIC is supplied on minidiskette, together with a user manual, for $49.95. Contact PerCom Data Company, 318 Barnes, Garland, TX 75042; (214) 272-3421.
Circle No. 194

Diablo Printer Control Program

Computer Services markets a new control program called Bi-Direct for the Diablo Hytype II printer. The first release, available for the CP/M operating system, allows increased printing speed and easier control of printer functions, according to the company.

Bi-Direct takes the text output to the list device and formats it for bi-directional printing. The formatting insures the print head always moves the shortest possible distance to print a line.

Features include easier control over spacing between printed characters and between lines. Users can change the printing color from black to red at any time. Paging control and headers printed at the top of each page are also a part of Bi-Direct. Any or all of the functions can be turned on or off under user program control.

Bi-direct, shipped on an 8" CP/M format diskette, retails for $99.95. Contact Computer Services, 30 Hwy. 321, N.W., P.O. Box 2292, Hickory, NC 28601; (704) 294-1616.
Circle No. 196

Inventory Control and Word Processing for the TRS-80

INV-III consists of two programs: data base manager and report generator.

Data base allow the user to initialize the data base, add, update and display an inventory record. The "level update" command is used to update inventory level. It also displays the updated level, and amount of the transaction and flags if the inventory is below a pre-defined stock safety level. Daily activity is summarized by giving the total inventory in and out, and the estimated profit for the day.

"Order report" gives the inventory below the safety level, and associated order information, such as order quantity, vendor code and total amount in dollars.

"Performance report" gives a summary of inventory system such as total inventory cost, total number of out-of-stock items and over-stocked items.

The system also assigns priority to order. For example, order out-of-stock items first, then the high-profit items, and then the high-usage items.

A maximum of 640 records is allowed in a diskette; more if the diskette is exclusively used for data.

Record fields include description, order amount, stock level, safety level,

annual usage, unit cost price, unit sell price, location code and vendor code.

The system requires DOS and 16K. Unit price is $39.

WORD-III is a text processor for the TRS-80 DOS system with 16K memory. It accepts lines of text interspersed with lines of format control information and formats the text into a displayable document.

The processor features automatic line filling and adjusting, right margin justification, page numbering, centering, title, page size, line width, indent and vertical spacing control. Storage of text files is on diskettes.

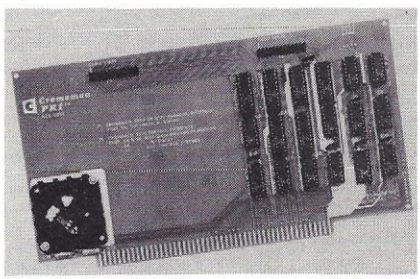
Unit price is $39.

For more information contact Micro Architect, 96 Dothan St., Arlington, MA 02174. *Circle No. 197*

P.C. BOARDS

Printer Interface Card

Cromemco's new printer interface (PRI) card allows interfacing either dot-matrix or daisy-wheel printers to your computer system.



The PRI card is designed with two interfaces. One uses the "Centronics parallel" convention and interfaces with Cromemco Model 3779 or 3703 dot-matrix printers. The second interface uses the "daisy-wheel parallel" convention and interfaces with Model 3355 daisy-wheel printer.

The second interface has built-in ribbon-lift and ribbon-lowering circuitry to free the software over-head normally required for this function. Each of the two interfaces has an individual cable connection on the top edge of the card.

The PRI card is available factory-assembled only for $195. Cables, which cost $15, are available in two lengths: 62 cm and 110 cm. For additional information contact Cromemco, Inc., 280 Bernardo Ave., Mountain View , CA 94043. *Circle No. 198*

64K RAM Card from Microcosm

Microcosm, Inc., has developed a 64K RAM card that reduces system card count by using only one S-100 card slot. It uses the same power as the standard 16K RAM card, thus lowering power requirements, the company said. Buffered signal lines mean less loading on busses. Memory is expandable in 16K byte increments up to 64K bytes and memory may be disabled in 256

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byte blocks for ROM programs. The fast cycle time of the 16 x 1 dynamic ROM means no wait states are needed for reads, writes or refreshing, the company said.

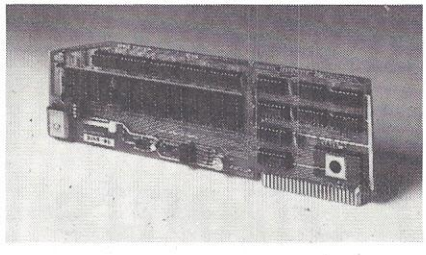
For more information contact Microcosm Inc., 534 W. 9460 St., Sandy, UT 84070; (801) 566-1322. *Circle No. 199*

Mountain Hardware's Apple Clock

Mountain Hardware has introduced a Real-Time Calendar/Clock for Apple II computers.

The Apple Clock keeps time and date in 1 ms increments continuously for over one year. Calendar, clock and event timer functions are accessed from BASIC using routines carried in on-board ROM.

Features include: crystal controlled for accuracy; on-board rechargeable battery to keep the Clock running during computer down times; software for calendar and clock routines; event timer contained in on-board ROM; and



an interrupt feature which can be programmed to make efficient use of computer time.

Applications include a program to print out appointments; data transactions; games in which elapsed time is important; and time events.

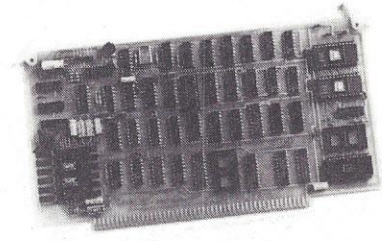
Price of the Apple Clock is $199 assembled and tested. For more information contact Mountain Hardware, Inc., 300 Harvey West Boulevard, Santa Cruz, CA 95060; (408) 429-8600. *Circle No. 200*

Board Features Reverse Video

Vector Graphic Inc., introduced a higher density version of the Flashwriter Video Board. Flashwriter II features optionally-controlled reverse video.

Displaying 80 characters × 24 lines, Flashwriter II uses an 8 × 10 dot matrix for 1920 character positions in a 2048 byte memory block.

In addition to normal video, reverse video is optionally controlled by the higher order bit of the character code.



As many as 256 characters can be generated by 2708/2716 EPROMS which may be user-programmed for special symbols or graphic displays.

Flashwriter II allows updating of the screen via memory-mapped I/O. Special circuitry prevents flashes on the screen when updating memory, and a keyboard port with latched data provides interface to Vector Graphic's Mindless Terminal or other parallel keyboards.

The Flashwriter II is priced at $320. For more information contact Vector Graphic Inc., 31364 Via Colinas, Westlake Village, CA 91361; (213) 991-2302. *Circle No. 201*

64K Byte Memory for S-100 Microcomputers

Chrislin Industries designed its CI-S100 specifically for SOL, Cromemco, North Star and other S-100 bus microcomputers. The dynamic RAM memory module requires no wait states at 2 or 4 MHz. The new memory is compatible with most S-100 bus microcomputers including the Z-80 at 4 MHz. The CI-S100 plugs directly into the memory slots of most S-100 microcomputers, according to Chrislin.

Features include expandability to a half Megabyte with a bank select feature that allows selection of up to eight 64K byte memory cards. On-board hidden refresh requires no outside intervention.

Available with battery backup capability, the module is 5" × 10".

Single quantity price is $695. For more information contact Chrislin Industries, Inc., 31312 Via Colinas, #102, Westlake Village, CA 91361; (213) 991-2254. *Circle No. 202*

LITERATURE

Application Notes

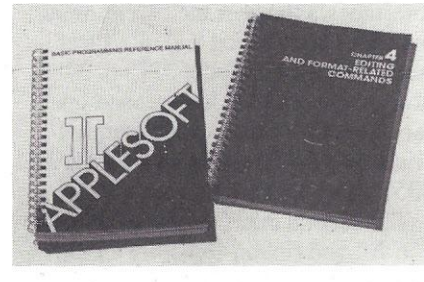
Connecticut microComputer offers two free application notes. Application Note Number 3 gives a BASIC program listing of a screen dump to printer. Application Note Number 4 lists a BASIC plot routine for the Commodore PET computer.

For copies of these applications notes, contact Connecticut microComputer, 150 Pocono Road, Brookfield, CT 06804; (203) 775-9659. *Circle No. 203*

Applesoft II BASIC Programming Reference Manual

Apple Computer, Inc., has made available a programming reference manual for the Applesoft II language, describing the extended programming capabilities of Applesoft II Floating-Point BASIC.

The manual assumes the reader has a working knowledge of BASIC and only wants to learn the additional features offered by Applesoft II; it is not intended as a text on BASIC, said the company. Advanced programmers will find the manual especially helpful. For those who have no knowledge of BASIC, Apple Computer provides free of charge with the computer (also sold separately at $5.95) a comprehensive self-teaching manual, entitled "Apple II BASIC Programming Manual", that introduces BASIC programming in the context of the Apple II computer.



The reference manual is comprised of ten chapters plus fifteen appendices containing additional reference material. Chapter 1 (Getting Started) describes what the language offers and provides an overview of Applesoft commands for those who have little ex-

perience programming in BASIC. Chapter 2 (Definitions) describes Applesoft's syntax.

Chapters 3 through 10 present detailed explanations of Applesoft's commands, grouped by subject matter: System and Commands, Editing and Format-Related Commands, Commands Relating to Flow of Control, Graphics and Frame Controls, High-Resolution Shapes, and Some Math Functions. The manual is priced at $6.95 For more information contact Apple Computer, Inc., 10260 Bandley Dr., Cupertino, CA 95014; (408) 996-1010. *Circle No. 204*

Small Business Computer Survey

Management Information Corporation has published the results of their fourth annual survey on small business computers, peripherals and software in the February 1979 issue of *Small Business Computer News*. The responses of 568 companies using 689 small business computer systems and 1145 peripheral devices are inlcuded in this compilation. Also rated are the products of 124 software suppliers.

The results of the users' ratings reveal the following findings:

- Service and manufacturer support have, once again, received the lowest ratings.
- Although the equipment ratings for this year are substantially good, the software ratings are, in general, low.
- The computer marketplace now includes many unsophisticated small businesses with minimal data processing background.

This report is available for $7.50. Contact Management Information Corporation, 140 Barclay Center, Cherry Hill, NJ 08034; (609) 428-1020. *Circle No. 205*

Vendor Selection Procedure

A free set of procedures for evaluating and selecting vendors of hardware, software and processing services is offered by Info III, publishers of self-study computer training courses. The Vendor Selection Procedure consists of 40 steps divided into five phases. The procedure starts with defining processing needs and ends with the development of an installation plan.

The basic approach followed uses the development of a definitive Request for Proposal (RFP) document to ensure accurate description of user requirements and facilitate the comparison of vendor proposals. The five phases in the procedure are: (1) define your processing needs; (2) prepare and release an RFP; (3) evaluate and select a vendor; (4) contract with vendors; and (5) prepare an installation plan.

The procedures are adapted from Info III's *Computer Concepts for Small Business*, presenting the fundamentals of data processing in the small business

CIRCLE 40

environment. This learner-paced course of audio-cassette tapes and workbook covers basic computer concepts, including types of data and how they are processed, how systems are developed, the operation of implemented systems and how to select computer services. It is priced at $145.

Free copies of the Vendor Selection Procedure can be obtained from Info III, 21250 Califa St., Suite 107, Woodland Hills, CA 91367; (800) 423-5205 or (213) 999-5753. *Circle No. 206*

Case Study Brochure Details Department Store's Experience

A free, four-page case study brochure from Datatrol describes a department store's POS objectives and how they were realized through a multistore terminal network.

The system, installed in 1975 at the Sibley, Linsay & Curr department store chain of Rochester, NY, links 160 departments at nine branch locations to a central processor.

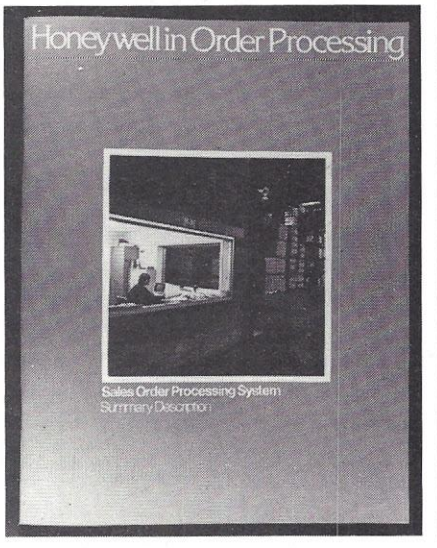
The brochure highlights the benefits that Sibley's has realized since the Datatrol POS system was installed, especially the reduction in the cost of collecting data.

In addition to handling sales data, the terminals have a credit authorization function. The Datatrol POS system can also generate a variety of merchandising and financial reports, and training time for terminal operation is minimal as compared to conventional systems, Datatrol said.

For more information contact Datatrol, Inc., Marketing Services, Kane Industrial Drive, Hudson, MA 01749. *Circle No. 207*

Sales Order Processing System Brochure

An illustrated 48-page brochure, "Honeywell in Order Processing", describes the company's Series 60 automated sales order processing software system, which can run both online and in batch modes.



The Honeywell system can accept and record customer entry information; verify customer credit; check inventory availability; reflect order information for control and reporting; and prepare documents necessary for invoicing, packing and shipping.

Through use of flow charts, tables, photographs and various printout-report samples, the brochure provides details on the three freestanding subsystems that make up the Sales Order Processing System: Order Entry, Billing, Shipping/Inventory Accounting.

The publication states that one or more of the subsystems can be modified without considering its impact on the others. Even within a given subsystem the user can by-pass unnecessary functions on a run-by-run basis.

Since customers' balances and inventory levels are automatically updated as transactions are entered, the user can determine at the time an order is entered whether or not the stock is available and if the customer is within his credit limit.

For more information request brochure No. AT82, Rev. 1, from Honeywell Publications Distribution Center, 38 Life St., Brighton, MA 02135. *Circle No. 208*

Uarco Minicatalog

Uarco Incorporated has issued an illustrated minicatalog covering a samp-

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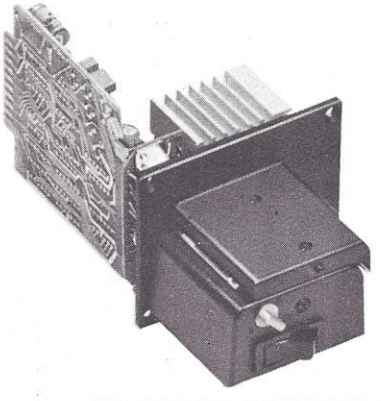

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CIRCLE 41

ling of data processing supplies offered by its Small Computer Shopping Center. Included are digital cassettes, diskettes, disk cartridges, stock computer forms, continuous file cards, stock data processing labels, continuous envelopes, Data-Mailer forms, expandable envelopes, data processing binders and forms processing equipment. The minicatalog is available free from Uarco Incorporated, West County Line Road, Barrington, IL 60010; (312) 381-7000. *Circle No. 209*

Minicomputer Software Packages from RSI

Resource Software International announced publication of its Catalog of Mini-Computer Software, 1979 edition. The catalog has 330 packages. New applications include bills of materials, order entry, personnel and computer-aided education. Additional accounting, analytical, engineering and manufacturing packages are available.

The 400-page catalog costs $49.95, is tab indexed for reference and bound in a 3-ring binder. Contact Resource Software International, Inc. 140 Sylvan Ave., Englewood Cliffs, NJ 07632; (201) 947-6104. *Circle No. 210*

Versatile Matrix Printers Brochure

A series of matrix printers is described in an eight-page brochure available free from Dataroyal, Inc.

The 120-200 character-per-second printers in the IPS 7000 series are designed for end users who need more than one type of printer to handle differing application requirements.

The Dataroyal printers are microcomputer controlled and can accommodate any of a wide range of programs stored by Dataroyal on Programmable Read-Only Memory (PROM) chips. As a result, the same basic printer can operate with different communications interfaces, or at different speeds, or with different character sets.

The brochure includes both applications information and technical specifications. For more information contact Dataroyal, Inc., 235 Main Dunstable Road, Nashua, NH 03061; (603) 883-4157. *Circle No. 211*

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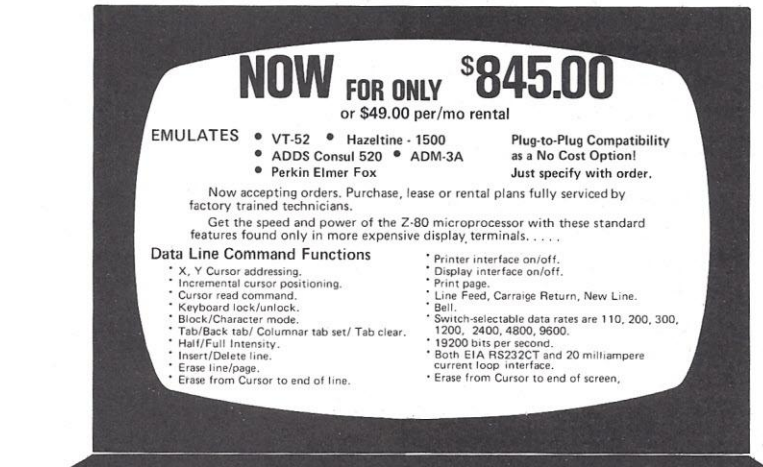

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CIRCLE 43

Guide to Using Business Software

Intended to reduce undetected errors in business computers, a Reymont Associates report, "Improving EDP Software Production", provides guidelines for project management and quality control in developing, installing and maintaining computer programs.

Directed at managers responsible for software projects, the report outlines typical problems in development, and offers guidance on design and development, testing, maintenance, documentation and the use of software production tools.

"Improving EDP Software Production" is available for $5. For more information contact Reymont Associates, 29 Reymont Ave., Rye, NY 10580. *Circle No. 213*

Using the Z-80 Microprocessor on the Multibus

Mupro Corp. has announced a new MBC Memory Series Note which details use of the Z-80 microprocessor on the Multibus. This application note explains the CPU and bus timing and discusses the implementation for both 2.5 MHz and 4 MHz operation.

Detailed is an implementation which allows the Z-80 microprocessor to operate at 2.5 MHz with Mupro's Multibus memory boards without the penalty of a wait state.

The Mupro memory boards are guaranteed to operate at 3 MHz and come in 4 sizes: 16K, 32K, 48K and 64K bytes. In addition, parity and error checking and correcting boards are available which operate at 3 MHz.

For more information contact Mupro, 424 Oakmead Parkway, Sunnyvale, CA 94086; (408) 737-0500. *Circle No. 214*

Siemens Brochure Describes Teleprinter

A six-page brochure from Siemens Corporation outlines applications featuring the company's PT-80 modular electronic teleprinter. Designed for office use, the new terminal can be used as a TWX, data terminal, stand alone printer or a teleprinter with memory and intelligence.

For more information contact Data Communications Division, Siemens Corporation, 186 Wood Avenue South, Iselin, NJ 08830. *Circle No. 215*

Datatrol Brochure On POS For Specialty Stores

A versatile, low-cost POS terminal designed by Datatrol, Inc., for use in specialty retail stores is featured in a new 4-page brochure.

The RS-6052 terminal captures point-of-sale transaction information, including sales trends, inventory control, payroll and accounts receivable, on a data cartridge suitable for direct or remote computer input.

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CIRCLE 45

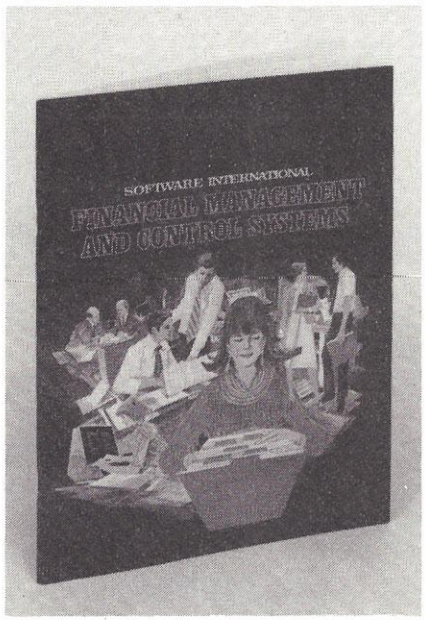
For a copy of the brochure, write Datatrol, Inc., Marketing Services, Kane Industrial Drive, Hudson, MA 01749. *Circle No. 216*

Guidebook for Accounting and Data Processing Executives

Software International Corporation has published a 42-page easy-to-understand guide for accounting and data processing executives concerned with day-to-day financial reporting. It is available free of charge for a limited time only.

The guidebook is useful for data processing and accounting professionals involved in the selection of computer-based financial applications, the company said. Based on case histories, the manual features many charts, illustrations and sample reports.

The guidebook highlights key areas of interest and discusses them in management accounting terms. Specific areas considered are: general ledger and financial reporting,



accounts payable and expense analysis, accounts receivable and cash management, fixed asset accounting and property control and payroll/personnel.

For more information contact Software International, 2 Elm Square, Andover, MA 01801. *Circle No. 217*

Wallace Electronics' Buyer's Guide

Wallace Electronics offers a buyer's guide of microcomputer software, accessories and supplies for the Apple II and TRS-80. The guide is updated weekly. Most items listed in the guide are in stock and ready for delivery, the company said.

The buyer's guide is free; fifty cents for postage and handling is requested. For more information contact Ronald A. Wallace, Wallace Electronics, Inc., 4921 N. Sheridan Rd., Peoria, IL 61614. *Circle No. 218*

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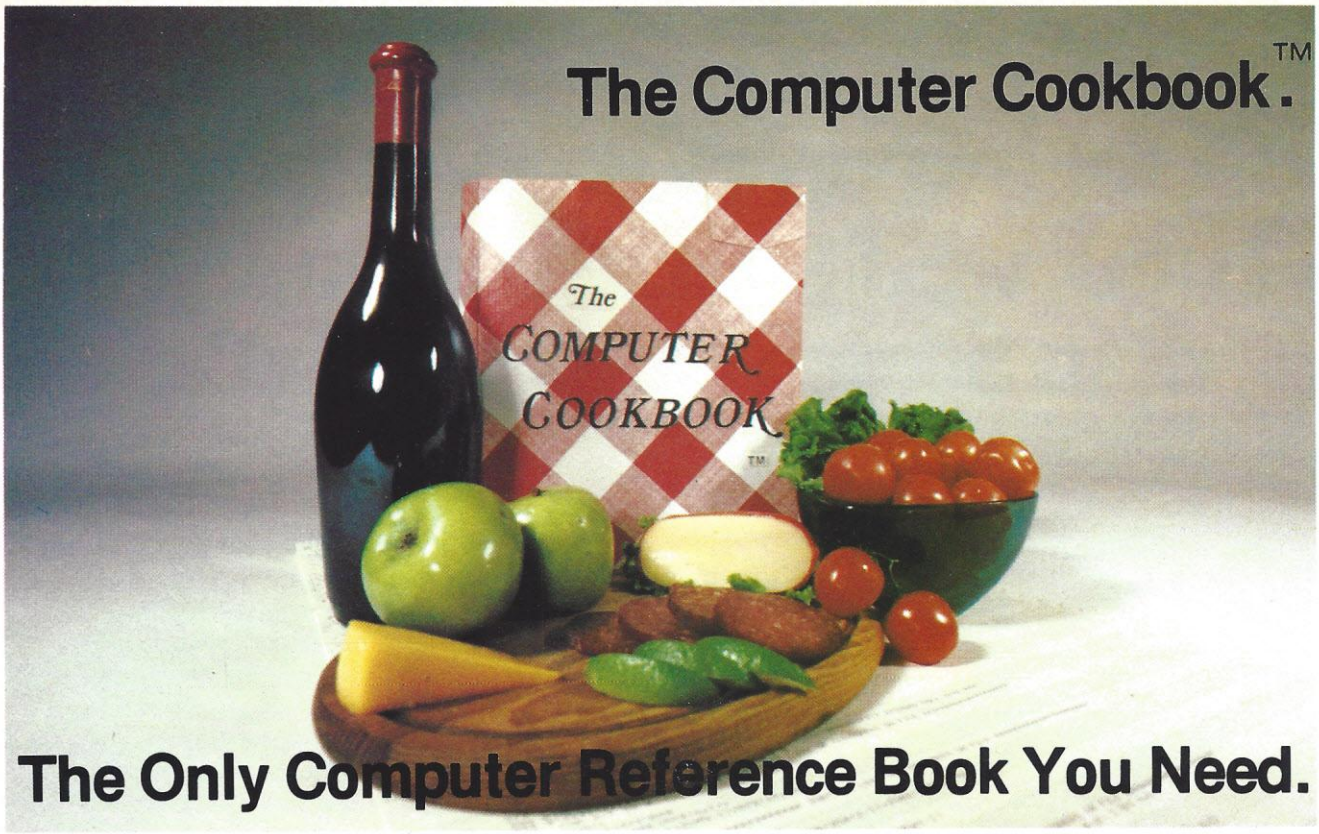

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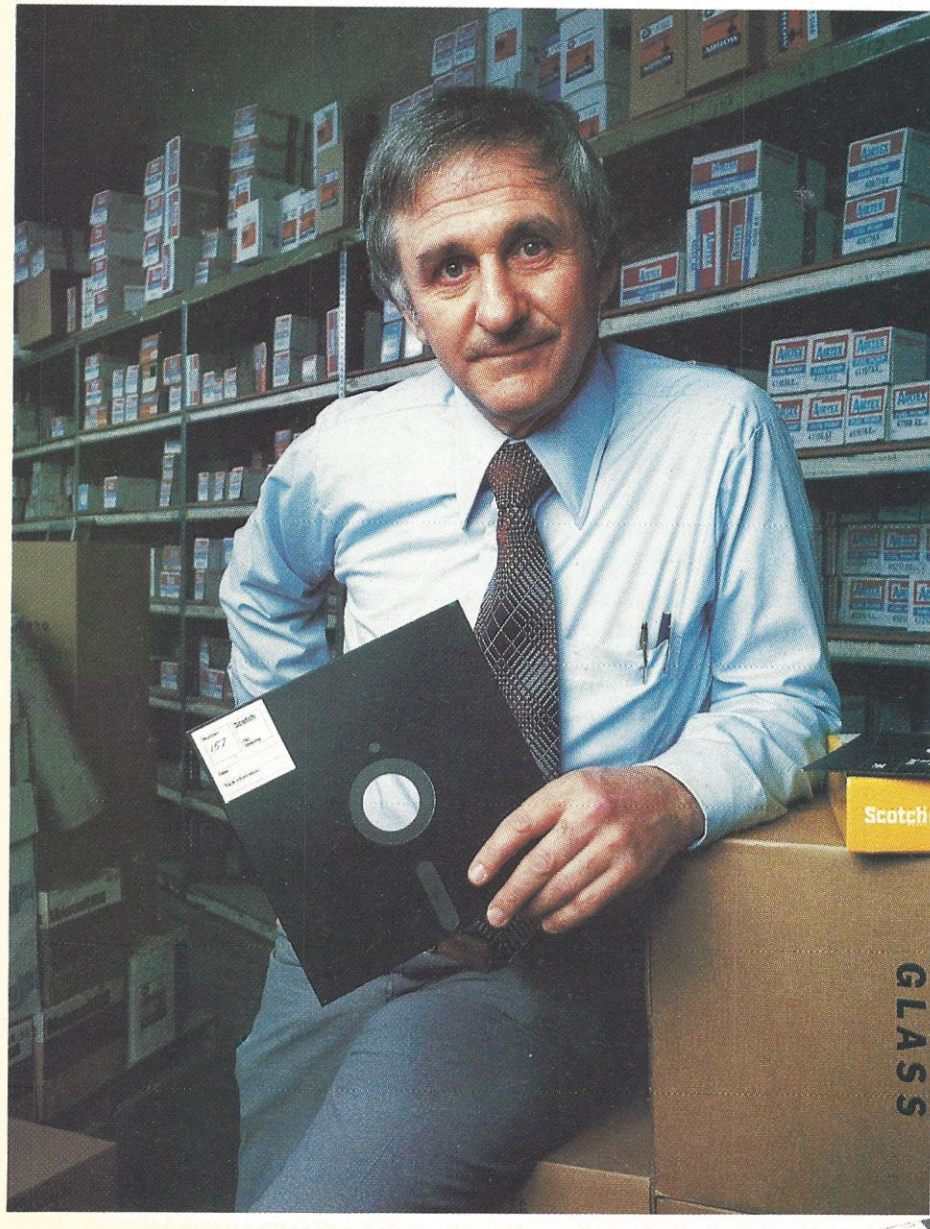

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